2001 Annual Report
Monitoring Events 18 and 19
Sites 1 and 3 and Eastern Plume
Naval Air Station, Brunswick, Maine

Contract No. N62472-92-D-1296
Contract Task Order No. 0047

U.S. NAVAL AIR STATION
BRUNSWICK, MAINE

Prepared for

Department of the Navy
Engineering Field Activity Northeast
Naval Facilities Engineering Command
10 Industrial Highway
Mail Stop No. 82
Lester, Pennsylvania 19113-2090

Prepared by

EA Engineering, Science, and Technology, Inc.
Southborough Technology Park
333 Turnpike Road, Route 9
Southborough, Massachusetts 01772

November 2003
FINAL
296.0047

EA Engineering, Science, and Technology, Inc.

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6 November 2003

Ms. Christine Williams
U.S. Environmental Protection Agency
Region 1
1 Congress Street, Suite 1100 (HBT)
Boston, Massachusetts 02114

Ms. Claudia Sait
Maine Department of Environmental Protection
State House, Station 17
Augusta, Maine 04333-0017

RE: Final 2001 Annual Report, Monitoring Events 18 and 19, Sites 1 and 3 and Eastern Plume, Naval Air Station, Brunswick, Maine
Contract No. N62472-92-D-1296; Contract Task Order No. 0047
EA Project No. 29600.47

Dear Ms. Williams/Ms. Sait:

On behalf of the Department of the Navy, EA Engineering, Science, and Technology, Inc. is pleased to submit the Final 2001 Annual Report for monitoring and sampling conducted at Sites 1 and 3 and Eastern Plume.

Included as an appendix to this report are response to comments received from EPA and MEDEP on the Monitoring Events 18 and 19 reports, and the 2000 Annual Report.

If additional information is required, please contact Mr. Anthony Williams at (207) 921-2445, or Mr. Lonnie J. Monaco (610) 595-0567, Extension 164.

Sincerely,

Alexander Easterday

Alexander C. Easterday, P.G.
CTO Manager

ACE/caw
Enclosures

cc: Distribution List:

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Alexander C. Easterday, P.G. CTO Manager	3 November 2003 Date
Kenneth W. Kilmer Program Manager	3 November 2003 Date

November 2003
FINAL
296.0047

QUALITY REVIEW STATEMENT

Contract No. N62472-92-D-1296 EA Project No.: 29600.47
Contract Task Order No. 0047
Activity: Naval Air Station, Brunswick, Maine

Description of Report/Deliverable:

Final 2001 Annual Report, Monitoring Events 18 and 19, Sites 1 and 3 and Eastern Plume, Naval Air Station, Brunswick, Maine

EA CTO Manager: Alexander C. Easterday, P.G.

In compliance with EA's Quality Procedures for review of deliverables outlined in the Quality Management Plan, this final deliverable has been reviewed for quality by the undersigned Senior Technical Reviewer(s). The information presented in this report/deliverable has been prepared in accordance with the approved Implementation Plan for the Contract Task Order (CTO) and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the CTO and/or the standard of care existing at the time of preparation.

Senior Technical Reviewer

11/3/03

Peter A. Conde, P.G. (Date)
Hydrogeologist

QUALITY REVIEW STATEMENT

Contract No. N62472-92-D-1296 EA Project No.: 29600.47
Contract Task Order No. 47
Activity: Naval Air Station, Brunswick, Maine

Description of Report/Deliverable:

Final 2001 Annual Report, Monitoring Events 18 and 19, Sites 1 and 3 and Eastern Plume, Naval Air Station, Brunswick, Maine

EA CTO Manager: Alexander C. Easterday, P.G.

As per State of Maine Department of Professional and Financial Regulations, Title 32 Chapter 73, Law, the sections of this document related to geology and geologic data interpretation have been reviewed for its technical content by the undersigned State of Maine Certified Geologist.

Specifically, Chapters 2 and 3 of this document have been reviewed by the undersigned for their geological interpretive content. This statement is based upon the review of the undersigned conducted during the preparation of this report, as dated below.

Certified Geologist Reviewer

Gina M. Calderone

STATE OF MAINE
GINA M. CALDERONE
No. GE442
CERTIFIED
GEOLOGIST

3 November 2003

Gina M. Calderone, CPG, CG (Date)
State of Maine Certified Geologist (No. GE442)

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1. INTRODUCTION

1.1 BACKGROUND

Under Contract No. N62472-92-D-1296, Contract Task Order No. 0047, Engineering Field Activity Northeast, Naval Facilities Engineering Command contracted with EA Engineering, Science, and Technology, Inc. to perform long-term monitoring at Sites 1 and 3 and the Eastern Plume at Naval Air Station (NAS), Brunswick, Maine. NAS Brunswick is located south of the Androscoggin River between Brunswick and Cooks Corner, Maine. The locations of Sites 1 and 3 and the Eastern Plume are provided on Figure 1-1.

NAS Brunswick is an active base owned and operated by the Federal government through the Department of the Navy. In 1987, NAS Brunswick was placed on the National Priorities List by the U.S. Environmental Protection Agency (EPA), and is currently participating in the Navy's Installation Restoration Program. At Sites 1 and 3 and Eastern Plume, the Navy is performing long-term monitoring, maintenance, and corrective measures as part of the long-term remedial actions required by the Record of Decision for a remedial action dated June 1992 for Sites 1 and 3 (ABB-ES 1992a) and the Record of Decision for an interim remedial action dated June 1992 for the Eastern Plume (ABB-ES 1992b). Remedial actions included placement of a low permeability cap and slurry wall and 2 groundwater extraction wells at Sites 1 and 3, and installation and subsequent operation of 6 extraction wells at the Eastern Plume (Figure 1-2). A Long-Term Monitoring Plan (LTMP) was established pursuant to these Records of Decision (ABB-ES 1994), and recently revised by EA (2000a).

1.2 LONG-TERM MONITORING PROGRAM

The LTMP document, which is comprised of a Long-Term Monitoring Program; Quality Assurance Project Plan; Safety, Health, and Emergency Response Plan; and remedial construction technical specifications, establishes the monitoring/sampling requirements for Sites 1 and 3 and the Eastern Plume. The LTMP has been revised (February 2000) based on previously collected data. The objective of the Long-Term Monitoring Program is to obtain data necessary to monitor the long-term effectiveness of the remedial actions conducted at Sites 1 and 3 and the Eastern Plume. Monitoring and sampling data collected during the performance of long-term monitoring are being used to:

- Assess the ambient water quality conditions (groundwater and surface water) by collecting samples to monitor trends and assess effectiveness of remedial actions.

- Evaluate the effectiveness of the groundwater extraction system by assessing trends in the concentration of volatile organic compounds (VOCs) in groundwater within the boundaries of the Eastern Plume, and provide recommendations to improve system effectiveness.

- Evaluate the effectiveness of the landfill cap and slurry wall by evaluating trends in VOCs and Target Analyte List metals in surface water, groundwater, sediment, and leachate station seep samples within and adjacent to Sites 1 and 3.

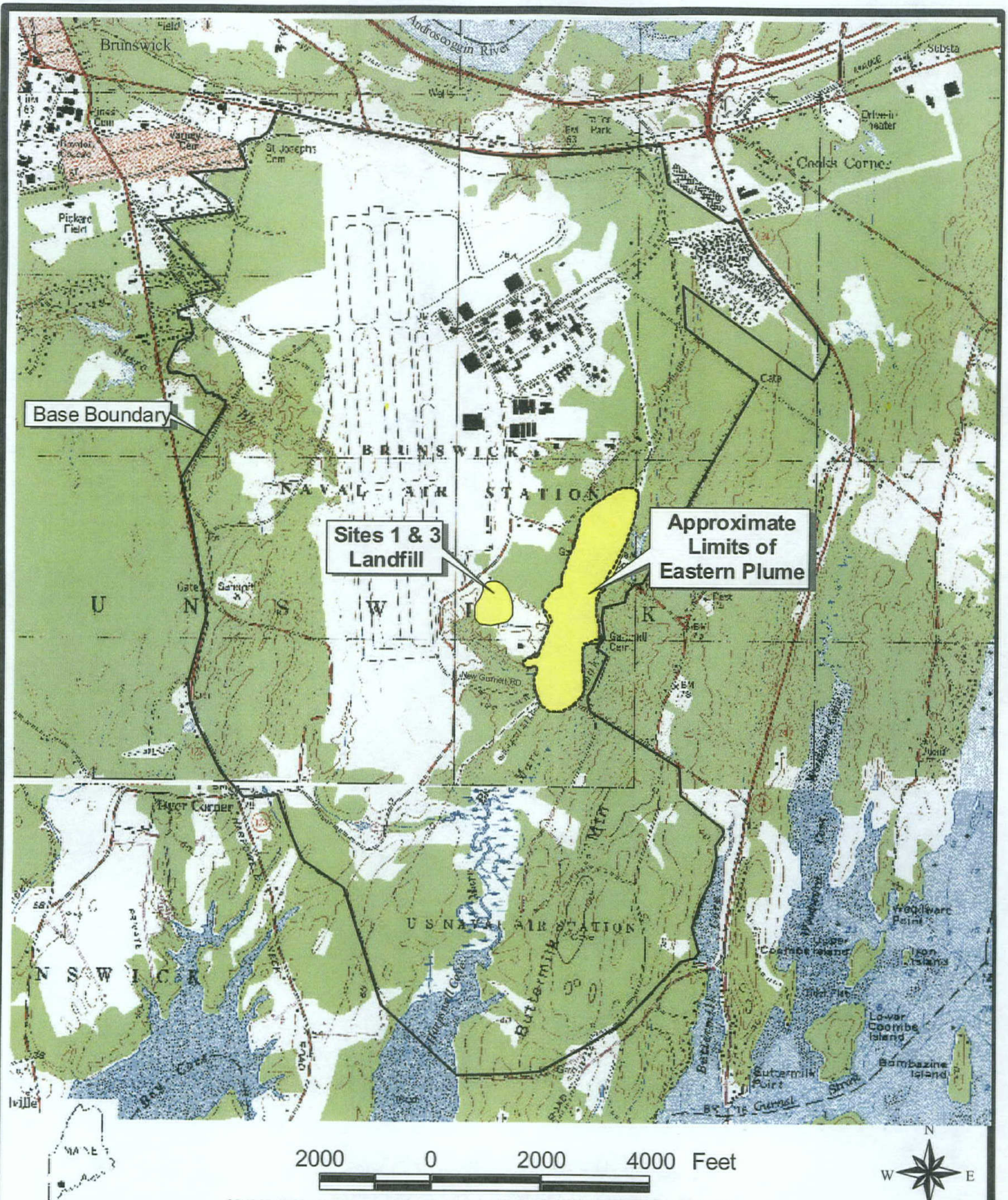
- Analyze the effective capture zone of the groundwater extraction system at Sites 1 and 3 and the Eastern Plume to determine the degree of hydraulic control achieved through remedial pumping.

Tables 1-1 and 1-2 summarize the sampling program completed during 2001 at Sites 1 and 3 and Eastern Plume, respectively. Table 1-3 summarizes the low-flow and aqueous diffusion samplers and placement of samplers established for the Eastern Plume.

1.3 ANNUAL REPORT ORGANIZATION

This 2001 Annual Report details the project activities conducted as part of the Long-Term Monitoring Program at Sites 1 and 3 and the Eastern Plume during the two monitoring events completed in 2001.

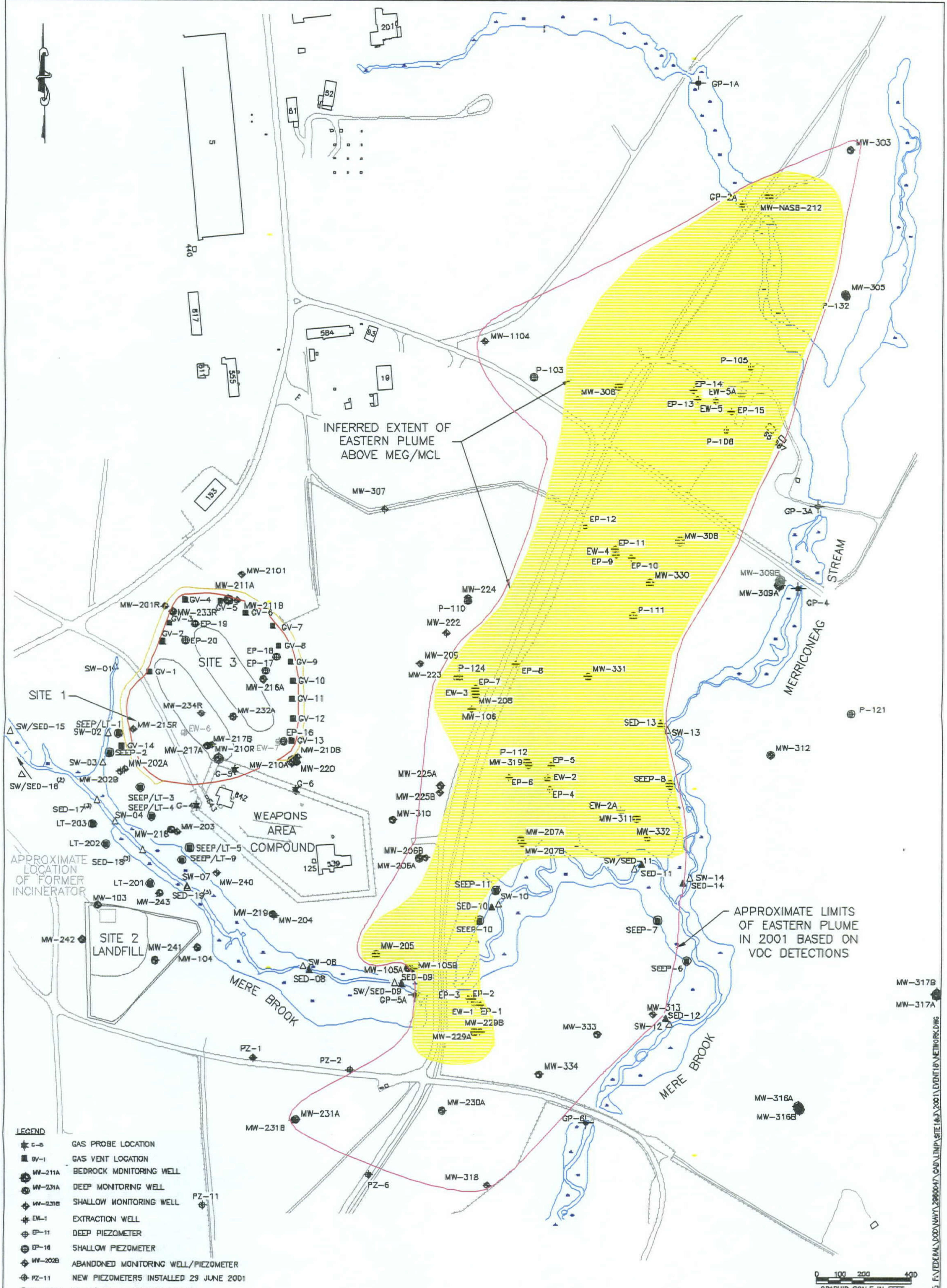
The format of the annual report is as follows. Chapter 1 provides an introduction and overview of the Long-Term Monitoring Program activities conducted at these sites. Chapter 2 presents the results of the two monitoring events conducted during 2001. Chapter 3 presents conclusions and recommendations based on site data. Responses to regulator comments for the Draft 2001 Annual Report are included in Appendix A. Graphs showing trends of data collected during the Long-Term Monitoring Program are presented in Appendix B. Responses to regulator comments for the 2000 Annual Report and the Monitoring Events 16 and 17 reports are included in Appendix C.



SOURCE MAPS: USGS ORRS ISLAND (1978) AND BRUNSWICK (1980) 7.5 MINUTE QUADRANGLES.

EA	SITES 1 AND 3 AND EASTERN PLUME NAVAL AIR STATION, BRUNSWICK, MAINE	FIGURE 1-1 SITE LOCATION MAP

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
ACE	DC	DC	ACE	AS SHOWN	28 OCT 2003	29600.47	I:\NASB_GIS \NAVY.APR



LEGEND

G-5	GAS PROBE LOCATION
GV-1	GAS VENT LOCATION
MW-211A	BEDROCK MONITORING WELL
MW-231A	DEEP MONITORING WELL
MW-231B	SHALLOW MONITORING WELL
EW-1	EXTRACTION WELL
EP-11	DEEP PIEZOMETER
EP-16	SHALLOW PIEZOMETER
MW-202B	ABANDONED MONITORING WELL/PIEZOMETER
PZ-11	NEW PIEZOMETERS INSTALLED 29 JUNE 2001
SEEP/LT-1	SEEP/SEEP SEDIMENT LOCATION
SW/SED-17	SURFACE WATER/SEDIMENT LOCATION
GP-5A	SURFACE WATER GAUGING POINT
	INFERRED AREA ABOVE STATE MEG/FEDERAL MCL CONCENTRATION
	FENCE
	APPROXIMATE LIMITS OF SLURRY WALL
	APPROXIMATE LIMITS OF SITES 1 AND 3
	APPROXIMATE LIMITS OF FORMER DISPOSAL TRENCHES
	APPROXIMATE BOUNDARY OF SITE 2 LANDFILL
	APPROXIMATE LIMITS OF EASTERN PLUME IN 2001

NOTE:

1. SITE PLAN TAKEN FROM THE INTERGRAPH VERSION 5 BASE-WIDE PLAN PROVIDED BY NAS BRUNSWICK PUBLIC WORKS DEPARTMENT ON 13 OCTOBER 1995.
2. SW-16 LOCATED APPROXIMATELY 1,000 FT UPSTREAM OF SITES 1 AND 3.
3. INFERRED EXTENT OF EASTERN PLUME ABOVE MEG/MCL BASED ON MONITORING EVENT 18 DATA (SEPTEMBER 2001).

FIGURE 1-2

LONG-TERM MONITORING NETWORK

SITES 1 AND 3 AND EASTERN PLUME
NAVAL AIR STATION, BRUNSWICK, MAINE

DATE: 28 OCTOBER 2003	PROJECT NUMBER: 29600.47
DESIGNED BY: ACE	SCALE: 1"=400'
DRAWN BY: SAP	FILE NAME: NETWORK.DWG
CHECKED BY: CNC	DRAWING NUMBER: -
PROJECT MANAGER: AE	SHEET NUMBER: -

FILE: F:\FEDERAL\DOD\NAVY\29600.47\CAD\LTMP\SITE1&3\2001\EVENT16\NETWORK.DWG

TABLE 1-1 SUMMARY OF THE 2001 LONG-TERM MONITORING PROGRAM AT SITES 1 AND 3

Sample Type/Location	Slurry Wall	2001 Sampling Dates	Sample Parameters			
			TCL VOC	TAL Elements	Field Parameters[a]	Water Level Gauging[b]
Shallow Monitoring Wells						
MW-201R	Outside	Not sampled	NR	NR	NR	X
MW-202A	Outside	APR, NOV	X	X	X	X
MW-203	Outside	APR, NOV	X	X	X	X
MW-204	Outside	APR, NOV	X	X	X	X
MW-210B	Outside	Not sampled	NR[c]	NR	NR	X
MW-211B	Inside	Not sampled	NR	NR	NR	X
MW-215R	Inside	Not sampled	NR[c]	NR	NR	X
MW-217B	Inside	APR, NOV	X	NR[d]	X	X
MW-234R	Inside	Not sampled	NR[c]	NR	NR	X
MW-240	Outside	APR, NOV	X	X	X	X
MW-2101	Outside	APR, NOV	X	X	X	X
Deep Monitoring Wells						
MW-216A	Inside	Not sampled	NR[c]	NR	NR	X
MW-217A	Inside	Not sampled	NR[c]	NR	NR	X
MW-218	Outside	APR, NOV	X	X	X	X
MW-219	Outside	APR, NOV	X	X	X	X
MW-220	Outside	Not sampled	NR[c]	NR	NR	X
MW-232A	Inside	Not sampled	NR[c]	NR	NR	X
MW-233R	Inside	Not sampled	NR	NR	NR	X
Bedrock Monitoring Wells						
MW-210A	Outside	Not sampled	NR	NR	NR	X
MW-210R	Inside	Not sampled	NR[c]	NR	NR	X
MW-211A	Inside	Not sampled	NR	NR	NR	X
Extraction Wells						
EW-06[e]	Inside	Not sampled	NR	NR	NR	X
EW-07[e]	Inside	Not sampled	NR	NR	NR	X

(a) Determination of field parameters in accordance with U.S. Environmental Protection Agency 600/4-79/020 using the following methods: pH (Method 150.1), temperature (Method 170.1), specific conductance (Method 120.1), and turbidity (Method 180.1). Optional field parameters, including dissolved oxygen (Method 360.1) and Eh, may also be included. Includes water level measurement.
(b) Water level gauging conducted during April and October.
(c) Not required since the 1998 Annual Report.
(d) Scheduled for VOC by diffuser only. Sample by low-flow in November included TAL elements.
(e) EW-06 and EW-07 are offline and not sampled, and can be reactivated if necessary.

NOTE: TCL = Target Compound List.
VOC = Volatile organic compounds (U.S. Environmental Protection Agency SW846).
TAL = Target Analyte List.
NR = Not required.
A complete description of sampling activities can be found in the Monitoring Events 18 and 19 reports for Sites 1 and 3 and Eastern Plume (EA 2002a, 2002b).

Sample Type/Location	Slurry Wall	2001 Sampling Dates	Sample Parameters			
			TCL VOC	TAL Elements	Field Parameters[a]	Water Level Gauging[b]
Shallow EP-Series Piezometers						
EP-16	Inside	Not sampled	NR	NR	NR	X
EP-17	Inside	Not sampled	NR	NR	NR	X
EP-18	Inside	Not sampled	NR	NR	NR	X
EP-19	Inside	Not sampled	NR	NR	NR	X
EP-20	Inside	Not sampled	NR	NR	NR	X
Leachate Station Seep						
SEEP-1	Outside	APR, OCT	X	X	X	NR
SEEP-3	Outside	APR[f]	X	X	X	NR
SEEP-4	Outside	APR[f]	X	X	X	NR
SEEP-5	Outside	APR[f]	X	X	X	NR
SEEP-9[g]	Outside	APR, OCT	X	X	X	NR
Leachate Station Sediment						
LT-1	Outside	APR, OCT	X	X	NR	NR
LT-3	Outside	APR	X	X	NR	NR
LT-4	Outside	APR	X	X	NR	NR
LT-5	Outside	APR	X	X	NR	NR
LT-9[g]	Outside	APR, OCT	X	X	NR	NR
Surface Water						
SW-04	Outside	APR, OCT	X	X	X	NR
SW-07	Outside	APR, OCT	X	X	X	NR
SW-08	Outside	APR, OCT	X	X	X	NR
SW-09	Outside	APR, OCT	X	X	X	NR
SW-15[h]	Outside	APR, OCT	NR[c]	X	X	NR
SW-16[h]	Outside	APR, OCT	NR[c]	X	X	NR
Sediment						
SED-09	Outside	OCT	NR	X[i]	NR	NR
SED-15[h]	Outside	OCT	NR	X[i]	NR	NR
SED-16[h]	Outside	OCT	NR	X[i]	NR	NR
SED-17	Outside	OCT	NR	X[i]	NR	NR
SED-18	Outside	OCT	NR	X[i]	NR	NR
SED-19	Outside	OCT	NR	X[i]	NR	NR

(f) Sample location dry during Monitoring Event 19 in October/November; no sample collected.
(g) SEEP-9 and LT-9 were identified in the field on 1 September 1999 and added to the Long-Term Monitoring Program.
(h) Surface water/sediment locations SW/SED-15 and SW/SED-16 are currently sampled as part of a separate program, although results are summarized in monitoring event reports.
(i) Sediment samples were also analyzed for organochlorine pesticides by U.S. Environmental Protection Agency Method 8081, total organic carbon, and grain size.

TABLE 1-2 SUMMARY OF THE 2001 LONG-TERM MONITORING PROGRAM AT EASTERN PLUME

Sample Type/Location	2001 Sampling Dates	Well Status	Sample Parameters: TCL VOC	Sample Parameters: Field Parameters[(a)]	Sample Parameters: Water Level Gauging[(b)]
Shallow Monitoring Wells					
MW-105B	NS	NA	NR	NR	X
MW-106	NS	NA	NR[(c)]	NR	X
MW-206B	NS	NA	NR[(c)]	NR	X
MW-207B	NS	NA	NR[(c)]	NR	X
MW-209	NS	NA	NR[(c)]	NR	X
MW-222	NS	NA	NR[(c)]	NR	X
MW-223	NS	NA	NR[(c)]	NR	X
MW-224	MAY, NOV	Perimeter	X	X	X
MW-225B	NS	NA	NR[(c)]	NR	X
MW-229B	NS	NA	NR[(c)]	NR	X
MW-231B	MAY, NOV	Sentinel	X	X	X
MW-307	NS	NA	NR[(c)]	NR	X
MW-313	MAY, NOV	Sentinel	X	X	X
MW-318	MAY, OCT	Sentinel	X	X	X
MW-332	MAY, NOV	Interior Plume	X	X	X
MW-1104	MAY, NOV	Perimeter	X	X	X
Deep Monitoring Wells					
MW-105A	APR, NOV	Perimeter	X	X	X
MW-205	APR, NOV	Interior Plume	X	X	X
MW-206A	NS	NA	NR[(c)]	NR	X
MW-207A	MAY[(d)]	Interior Plume	X	X	X
MW-207AR		Interior Plume			X
MW-208	NS	NA	NR[(c)]	NR	X
MW-225A	APR, OCT	Perimeter	X	X	X
MW-229A	MAY, NOV	Perimeter	X	X	X
MW-230A	APR, OCT	Sentinel	X	X	X
MW-231A	MAY, OCT	Sentinel	X	X	X
MW-303	MAY, NOV	Sentinel	X	X	X
MW-305	APR, NOV	Sentinel	X	X	X
MW-306	MAY, OCT	Interior Plume	X	X	X
MW-310	NS	NA	NR[(c)]	NR	X
MW-311	MAY, NOV	Interior Plume	X	X	X
MW-312	NS	NA	NR	NR	X

(a) Determination of field parameters in accordance with U.S. Environmental Protection Agency/600/4-79/020 using the following methods: pH (Method 150.1), temperature (Method 170.1), specific conductance (Method 120.1), and turbidity (Method 180.1). Optional field parameters, including dissolved oxygen (Method 360.1) and Eh, may also be included. Also includes water level measurement.
(b) Water level gauging conducted during April and October.
(c) Not required since the 1998 Annual Report.
(d) Well MW-207A destroyed; well MW-207AR installed in August 2001 as replacement.

NOTE:
TCL = Target Compound List.
VOC = Volatile organic compounds (U.S. Environmental Protection Agency SW846).
NS = Not sampled.
NA = Not applicable.
NR = Not required.
Perimeter Well = Located at edge of the plume to monitor concentrations of plume boundary.
Sentinel Well = Outside area of known contamination to be used to warn of plume migration.
Interior Plume Well = Within area of known contamination to monitor plume migration.
A complete description of sampling activities can be found in the Monitoring Event 18 and 19 reports for Sites 1 and 3 and Eastern Plume (EA 2002a and 2002b).

Sample Type/Location	2001 Sampling Dates	Well Status	Sample Parameters		
			TCL VOC	Field Parameters[a]	Water Level Gauging[b]
Deep Monitoring Wells (Continued)					
MW-319	APR	Interior Plume	X	X	X
MW-330	APR, NOV	Perimeter	X	X	X
MW-331	APR	Interior Plume	X	X	X
MW-333	MAY, NOV	Sentinel	X	X	X
MW-334	MAY, NOV	Sentinel	X	X	X
MW-NASB-212	MAY, OCT	Perimeter	X	X	X
Bedrock Monitoring Wells					
MW-308	APR, NOV	Sentinel	X	X	X
MW-309A	NS	NA	NR[c]	NR	X
MW-309B	APR, NOV	Sentinel	X	X	X
MW-316A	NS	NA	NR	NR	X
MW-316B	NS	NA	NR	NR	X
MW-317A	NS	NA	NR	NR	X
MW-317B	NS	NA	NR	NR	X
Shallow P-Series Piezometers					
P-103	NS	NA	NR	NR	X
P-110	NS	NA	NR	NR	Dry
P-111	APR, NOV	Perimeter	X	X	X
P-112	NS	NA	NR	NR	X
P-121	NS	NA	NR	NR	X
P-124	NS	NA	NR	NR	Dry
P-132	APR, NOV	Sentinel	X	X	X
Deep P-Series Piezometers					
P-105	NS	NA	NR[c]	NR[c]	X
P-106	APR, NOV	Interior Plume	X	X	X
Extraction Wells					
EW-01	NOV[e]	Interior Plume	X	X	X
EW-02A	MAY, NOV	Interior Plume	X	X	X
EW-03	NS	NA	NR[c]	NR	X
EW-04	MAY, NOV	Interior Plume	X	X	X
EW-05[f]	NA	Interior Plume	NA	NA	NA
EW-05A[f]	MAY, NOV	Interior Plume	X	X	X
Deep EP-Series Piezometers					
EP-1	NS	NA	NR	NR	X
EP-2	NS	NA	NR	NR	X
EP-3	NS	NA	NR	NR	X
EP-4	NS	NA	NR	NR	X
EP-5	NS	NA	NR	NR	X
EP-6	NS	NA	NR	NR	X
EP-7	NS	NA	NR	NR	X
EP-8	NS	NA	NR	NR	X
EP-9	NS	NA	NR	NR	X
EP-10	NS	NA	NR	NR	X
EP-11	NS	NA	NR	NR	X
EP-12	NS	NA	NR	NR	X
EP-13	NS	NA	NR	NR	X
EP-14	NS	NA	NR	NR	X
EP-15	NS	NA	NR	NR	X

(e) EW-01 was offline during Monitoring Event 18 (April-May) and not sampled.
(f) Pumping from extraction well EW-05 was terminated in January 2001 when replacement well MW-5A, installed in September 2000, was placed online.

Sample Type/Location	2001 Sampling Dates	Sample Parameters		
		TCL VOC	Field Parameters[a]	Water Level Gauging[a]
Surface Water				
SW-10	APR, OCT	X	X	NR
SW-11	APR, OCT	X	X	NR
SW-12	APR, OCT	X	X	NR
SW-13	APR, OCT	X	X	NR
SW-14	APR, OCT	X	X	NR
SEEP-10	APR[g]	X	X	NR
SEEP-11	APR, OCT	X	X	NR
GP-1	NS	NR	NR	X
GP-2	NS	NR	NR	X
GP-3	NS	NR	NR	X
GP-4	NS	NR	NR	X
GP-5	NS	NR	NR	X
GP-6	NS	NR	NR	X

(g) SEEP-10 was dry and not sampled during Monitoring Event 19.

TABLE 1-3 SUMMARY OF LOW-FLOW METHOD AND AQUEOUS DIFFUSION SAMPLER PLACEMENT FOR THE EASTERN PLUME VOLATILE ORGANIC ANALYSIS SAMPLES

Pilot Test Group No.	Well Identification (Well Depth)	Sample Method	
		Low-Flow Method	Aqueous Diffusion Sampler (No. of Samplers/Placement in Screen)
1	MW-105A (Deep)	No	1/deep
	MW-205 (Deep)	No	1/deep
	MW-224 (Shallow)	No	1/mid-point
	MW-NASB-212 (Deep)	No	1/shallow
	MW-229A (Deep)	No	1/mid-point
	MW-306 (Deep)	No	1/deep
	MW-311 (Deep)	No	1/deep
	MW-319 (Deep)	No	1/deep
	MW-331 (Deep)	No	1/mid-point
	MW-332 (Shallow)	No	1/mid-point
2	MW-1104 (Shallow)	Yes	3/shallow, mid-point, and deep
	MW-225A (Deep)	Yes	3/shallow, mid-point, and deep
	MW-230A (Deep)	Yes	3/shallow, mid-point, and deep
	MW-231A (Deep)	Yes	3/shallow, mid-point, and deep
	MW-231B (Shallow)	Yes	3/shallow, mid-point, and deep
	MW-303 (Deep)	Yes	3/shallow, mid-point, and deep
	MW-305 (Deep)	Yes	3/shallow, mid-point, and deep
	MW-308 (Bedrock)	Yes	3/shallow, mid-point, and deep
	MW-309B (Bedrock)	Yes	3/shallow, mid-point, and deep
	MW-313 (Shallow)	Yes	3/shallow, mid-point, and deep
	MW-318 (Deep)	Yes	3/shallow, mid-point, and deep
	MW-330 (Deep)	Yes	3/shallow, mid-point, and deep
	MW-333 (Deep)	Yes	3/shallow, mid-point, and deep
	MW-334 (Shallow)	Yes	3/shallow, mid-point, and deep
	P-132 (Shallow)	Yes	3/shallow, mid-point, and deep

NOTE: Aqueous diffusion sampler installation intervals are referred to as shallow (1-3 ft below top of screen), mid-point (4-6 ft below top of screen), and deep (7-9 ft below top of screen).

2. LONG-TERM MONITORING PROGRAM—2001

2.1 GROUNDWATER EXTRACTION AND TREATMENT SYSTEM 2001 PERFORMANCE SUMMARY

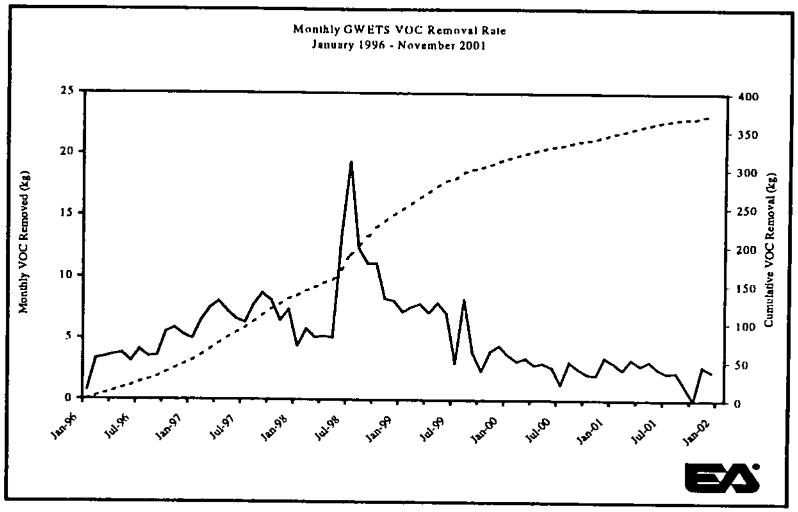
The groundwater extraction and treatment system operated continuously up to 11 September 2001 with the exception of brief periods when the system was offline for upgrades, maintenance, and repairs. On 11 September 2001, at 1119 hours, the extraction well network and treatment plant were ordered shut down by order of the Commanding Officer of NAS Brunswick as a result of the terrorist attacks in New York City, Washington, D.C., and Pennsylvania. During the 1 October 2001 project conference call between the Navy, Maine Department of Environmental Protection (MEDEP), and EPA remedial project managers, all parties agreed that the extraction well network and treatment plant would remain off until the completion of the Fall 2001 Long-Term Monitoring Program. The extraction well network and treatment plant were placed back in service on 13 November 2001 at 1139 hours. The extraction well network and treatment plant had been offline for a total of 63 days after 11 September 2001.

Minor operational interruptions during 2001 (lasting less than 24 hours) were attributable mainly due to plant maintenance (i.e., changing bag filters, installing valves, piping modifications, etc.). Table 2-1 summarizes the monthly flow rates for the four extraction wells (EW-01, EW-02A, EW-04, and EW-05A).

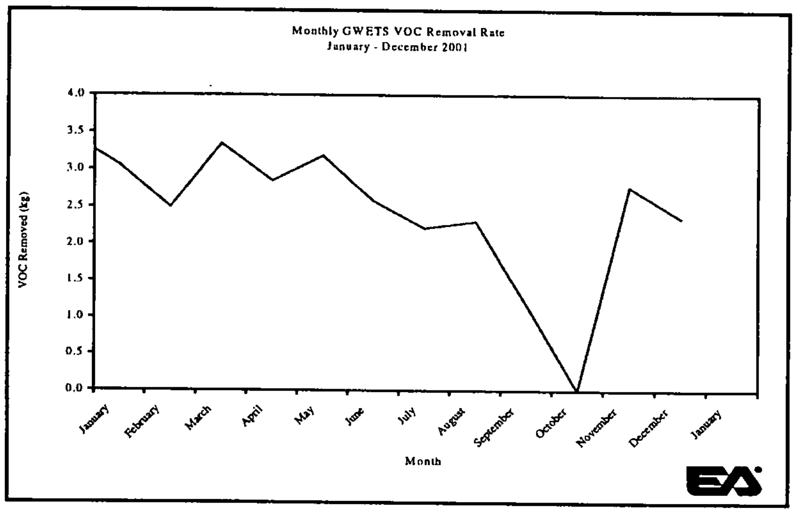
Extraction wells EW-01, EW-02A, EW-04, and EW-05A were operational during the majority of 2001 with minor exceptions (excluding when the system was off due to the tragic events of 11 September 2001). Extraction well EW-01 was offline on 9 January, 24 April – 8 May, 1 July – 29 August, 11 September – 12 November, and 15-18 November 2001. Extraction well EW-02A was offline on 9 January, 2-8 July, and 11 September – 12 November 2001. Extraction well EW-03 has remained inactive since identification of the well screen failure in December 1998. Extraction well EW-04 was offline on 9 January, 2-8 July, and 11 September – 12 November 2001. Extraction well EW-05 was terminated on 6 January 2001. Extraction well EW-5A was placed online on 10 January 2001 to replace EW-5. Extraction well EW-5A was offline 21 January, 2 July – 8 August, and 11 September – 12 November 2001.

Table 2-2 summarizes VOC removal achieved by the extraction wells in the Eastern Plume during the period January-December 2001. Concentrations of VOCs are based on laboratory analytical data provided in the monthly operations report for the groundwater extraction and treatment system. The mass of VOCs removed was calculated based on the sum of the detected concentrations of the nine VOCs included in the treatment plant operating permit issued by the Brunswick Sewer District in December 1994, although total VOC removal is likely to be greater than shown. The VOC removal rate was consistent throughout 2001, with the exception of October 2001 (the groundwater extraction treatment system was offline the entire month). The VOC removal rate for 2001 ranged from approximately 0.0 to 3.3 kg per month. The removal rates remained relatively the same from 2000 to 2001. The cumulative VOCs removed from the Eastern Plume continue to show a relatively consistent rate of removal during 2001.

Results of the effluent analyses indicated no violations of permit discharge limits established by the Brunswick Sewer District. VOC extraction rates were calculated using monthly total flow values.

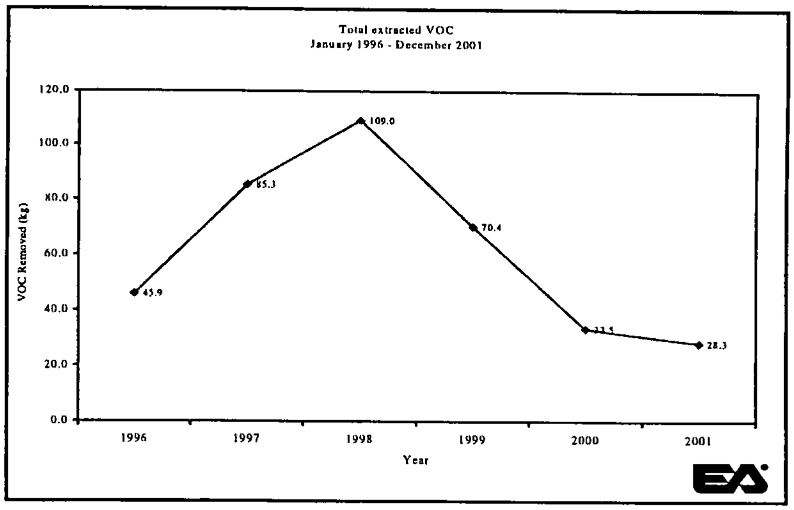


As shown in Table 2-2, a total VOC mass of approximately 28.3 kg, or 62.5 lb, was removed by the extraction well network during 2001 from the Eastern Plume. The total extracted VOCs has decreased since 1998, when a maximum VOC removal rate was achieved (105 kg for the year). The increase of VOC removal and subsequent decrease in 1999, 2000, and 2001 is likely the result of the additions of EW-02A and EW-05A, and success of removing VOCs from the area near MW-311. The graphs below show the monthly mass of VOCs removed by the groundwater extraction and treatment system during 2001 and the total extracted VOC mass between 1996 and 2001:



2.2 WATER LEVEL GAUGING PROGRAM

Water level measurements from the wells and piezometers were obtained during 2001 at the locations indicated in Tables 1-1 and 1-2 for Sites 1 and 3 and Eastern Plume, respectively. The gauging was performed in accordance with the LTMP (ABB-ES 1994; EA 2000a). Figure 2 of the monitoring event reports provides the locations of monitoring points that comprise the long-term monitoring network

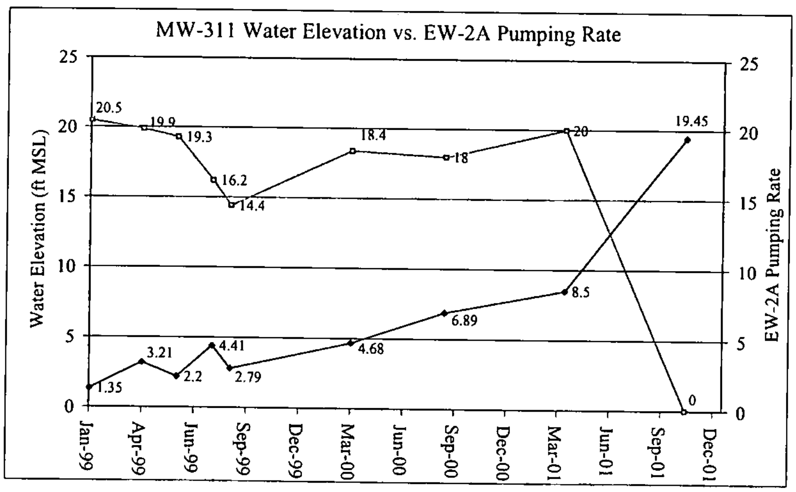


at Sites 1 and 3 and the Eastern Plume. Figure 3 of the monitoring event reports shows the locations of gauging points included in the long-term monitoring network. Figure 4 of the monitoring event reports shows the locations of sampling points included in the long-term monitoring network during 2001.

Gauging was completed in 2001 during Monitoring Event 18 (April) and Monitoring Event 19 (October-November). A summary of water elevations is presented in the reports for the April 2001 (EA 2002a) and October-November 2001 (EA 2002b) monitoring events.

Interpretive potentiometric surface maps were developed from the data collected during the two monitoring events. These maps are included within the reports for Monitoring Events 18 and 19 (EA 2002a, 2002b).

Figure 2-1 shows trends in the potentiometric water surface elevations at landfill wells from 1995 to 2001. Figure 2-2 compares water elevations measured during 2001 to waste elevations and monitoring points inside the Sites 1 and 3 landfill where waste was encountered. These two figures show that the recorded water surface continues to nbe below the waste, except in the vicinity of MW-234R where water elevations are slightly above the waste. Other water elevations measured during 2001 were stable during the measured times.



The graph to the right shows the trend of the potentiometric surface elevation noted at MW-311 compared to the pumping rate at EW-2A. Both wells are screened in the lower sand unit. Water elevations in MW-311 were relatively consistent with previous data and show an increasing trend. Water elevations in MW-311 fluctuated between 1.3 and 4.4 ft MSL in 1999, and then rose to 8.5 ft MSL by the Spring of 2001. The water level rose 11 ft when the pumps were turned off for 2 months following the events of 11 September 2001. Note the cessation of groundwater extraction during October 2001 resulted in water elevations rebounding to 19.4 ft mean sea level at MW-311. This increase in water elevations at this well is not unexpected, as artesian conditions were measured at MW-311 prior to the initiation of pumping at EW-2A.

2.3 GROUNDWATER MONITORING AND SAMPLING PROGRAM

Groundwater monitoring and sampling were performed in accordance with the LTMP (ABB-ES 1994; EA 2000a). Tables 1-1 and 1-2 provide summaries of the wells/piezometers included in the Long-Term Monitoring Program and the sample analysis program. Appendix A provides figures showing exceedances of Federal Maximum Contaminant Levels (MCLs)/State Maximum

Exposure Guidelines for (MEGs) long-term monitoring data collected between 1995 and 2001, and also provides graphs showing trends at long-term monitoring sample points for data collected between 1995 and 2001 for Sites 1 and 3 and the Eastern Plume. A detailed presentation of the sampling activities completed during Monitoring Events 18 and 19 can be found in specific reports (EA 2002a, 2002b).

The VOC isoconcentration figures were generated and are included with the reports for Monitoring Events 18 and 19 (EA 2002a, 2002b). These figures show interpreted areas with VOC concentrations detected above corresponding Federal MCLs or State MEGs, and were prepared to identify changes in concentrations that may be occurring over time.

2.3.1 Aqueous Diffusion Sampling Pilot Studies

An aqueous diffusion sampling pilot study was conducted within the Eastern Plume during Monitoring Event 18 (April 2001) and Monitoring Event 19 (October-November 2001). The objective of this study was to assess whether aqueous diffusion samplers could be used in place of low-flow sampling techniques. Table 2-3 summarizes the aqueous diffusion pilot study sampling intervals for the April and October-November 2001 sampling events.

A detailed presentation of the pilot studies can be found in the diffusion sampler pilot study letter reports (EA 2001a and EA 2001b).

2.4 SURFACE WATER, SEDIMENT, AND SEEP SAMPLING PROGRAM

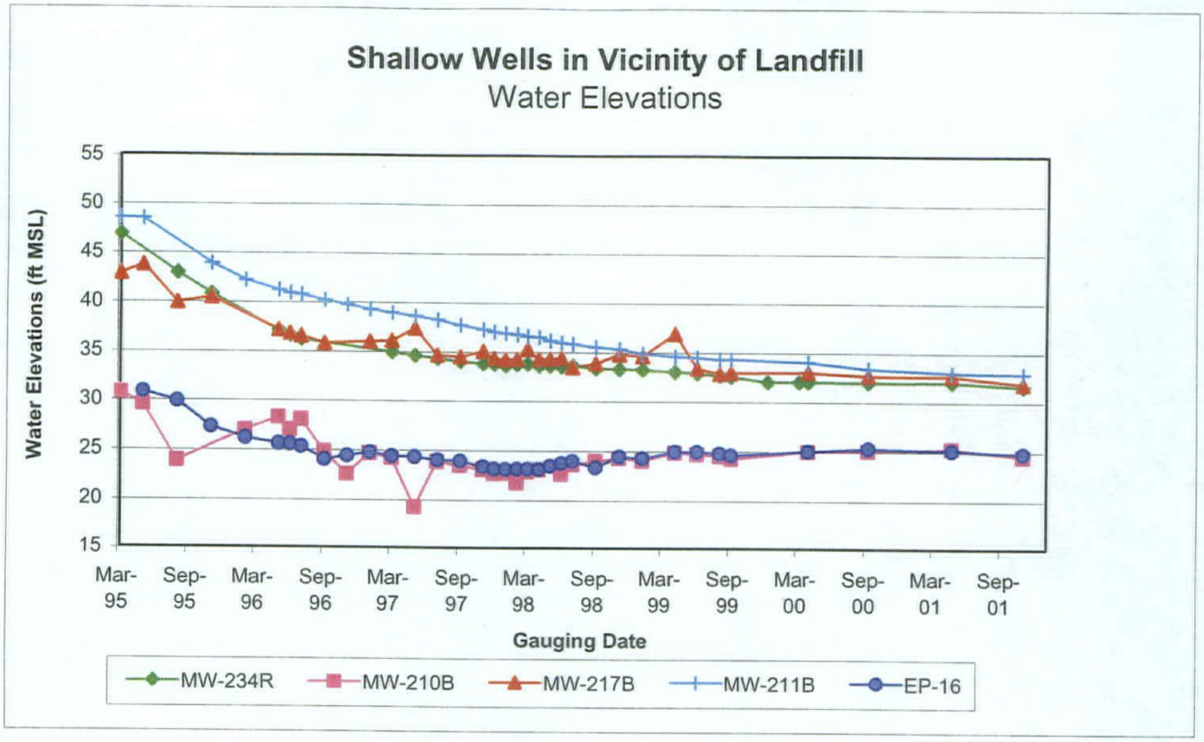
Tables 1-1 and 1-2 provide a summary of the sample parameters and locations included in the surface water, sediment, and seep sampling program. This sampling was conducted in accordance with the LTMP (ABB-ES 1994; EA 2000a). Appendix B provides graphs showing trends at long-term monitoring sample points for data collected between 1995 and 2001. Locations of the sampling stations collected during 2001 are shown on Figure 4 of the monitoring event reports.

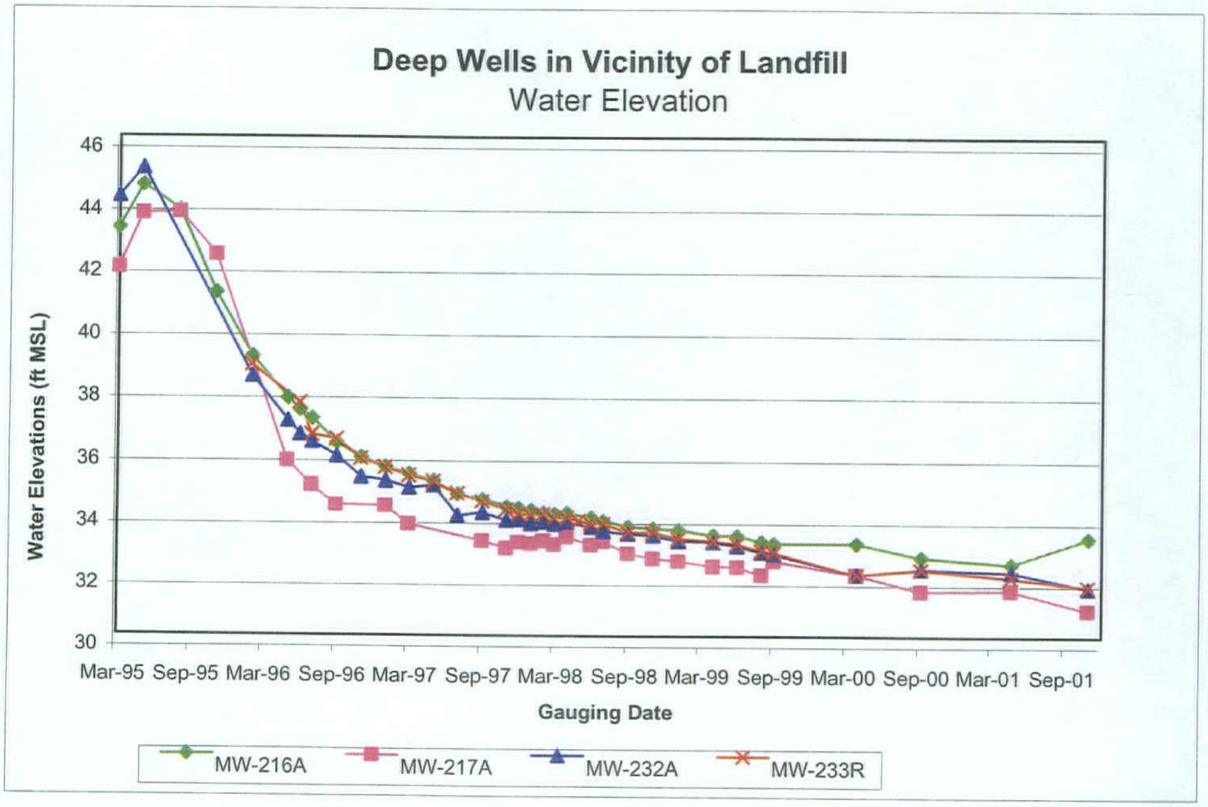
2.5 LANDFILL GAS MONITORING AND INSPECTION

Gas probe and vent monitoring was conducted at the Sites 1 and 3 landfill during the two bi-annual monitoring events. This sampling was conducted in accordance with the LTMP (ABB-ES 1994; EA 2000a). Gas measurements were collected at 12 of 14 gas vents. Gas vents GV-12 and GV-13 could not be sampled because installation of the gas vents was not completed. Visual inspection of the Sites 1 and 3 landfill was conducted in conjunction with the two monitoring events completed during 2001. One minor issue was identified that did not require repair, which involved small animal burrows near MW-217A. There was no evidence of erosion or exposure of the geotextile cover during this inspection.

2.6 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

As required by the LTMP (ABB-ES 1994), review of laboratory data was performed on selected quality control parameters to evaluate precision, accuracy, and completeness and data quality objective requirements. These data quality reviews were provided as appendixes to each of the monitoring event reports (EA 2002a, 2002b). The findings of the data quality review for Monitoring Events 18 and 19 indicate that the data collected were acceptable and usable. There were minor biases identified based on field/laboratory contamination, precision criteria, and accuracy criteria.





F:\Federal\DoD\Navy\2960047\ANNUAL\2001\Sites 1 & 3\[Figure 1.xls]Figure 1

Figure 2-1. Water elevations within the Sites 1 and 3 landfill, shallow and deep wells.

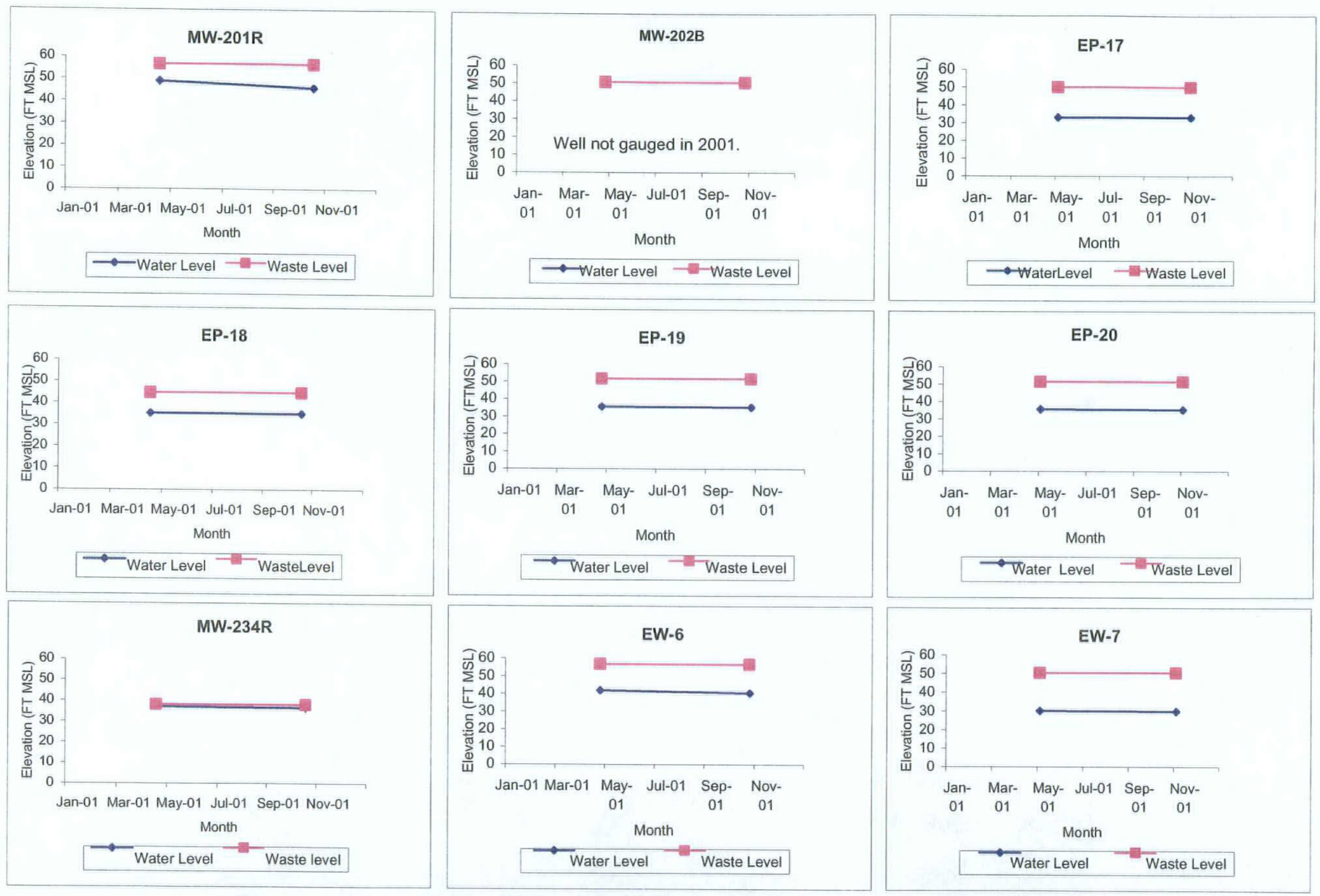


Figure 2-2. Water elevations compared to waste elevations during 2001 within the Sites 1 and 3 landfill.

F:\Federal\DoD\Navy\2960047\ANNUAL\2001\Sites 1 & 3\[Figure 2.xls]Figure 2

TABLE 2-1 EXTRACTION WELL OPERATIONAL SUMMARY AND FLOW RATES GROUND-WATER EXTRACTION AND TREATMENT SYSTEM (BUILDING 50) JANUARY–DECEMBER 2001

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total/Average gpm for 2001[a]
EW-01													
Extraction Well Operational Days	30	28	31	23	23	30	0	3	11	0	14	31	224
Average Operational Flow Rate (gpm)[b]	3	3	3	2.1	7	8.3	0	7.0	8.1	0	9.1	9	5.4
EW-02A													
Extraction Well Operational Days	30	28	31	30	31	30	24	31	11	0	18	31	295
Average Operational Flow Rate (gpm)[b]	20	20	20	20	20	17	20	16.6	17	0	16	16	18.4
EW-04													
Extraction Well Operational Days	30	28	31	30	31	30	24	31	11	0	18	31	295
Average Operational Flow Rate (gpm)[b]	18	18	18	18	18	18.4	18	19.6	21.7	0	22	22	19.3
EW-05													
Extraction Well Operational Days	5	0	0	0	0	0	0	0	0	0	0	0	5
Average Operational Flow Rate (gpm)[b]	8	0	0	0	0	0	0	0	0	0	0	0	8
EW-05A													
Extraction Well Operational Days	21	28	31	30	31	30	1	24	11	0	18	31	256
Average Operational Flow Rate (gpm)[b]	3.8	6.7	8	8	8.2	10.9	8	9.8	10	0	10	10	8.49

(a) Total/average gpm: Total = Extraction well operational days summed for the period January-December 2001; Average gpm = Numerical average calculated from monthly averages for the period January-December 2001.
(b) Average operational flow rate (gpm) calculated as the numerical average for those days in which the extraction well was fully operational.

TABLE 2-2 TOTAL DISSOLVED-PHASE VOLATILE ORGANIC COMPOUND REMOVAL FOR THE PERIOD 1 JANUARY THROUGH 31 DECEMBER 2001, GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

Parameter	Eastern Plume Influent	Parameter	Eastern Plume Influent
JAN 2001		AUG 2001	
Volume Extracted (gal)	1,700,715	Volume Extracted (gal)	1,920,123
Volume Extracted (L)	6,437,206	Volume Extracted (L)	7,267,666
Total VOC (µg/L)	475	Total VOC (µg/L)	317
Total VOC Removed (kg)	3.06	Total VOC Removed (kg)	2.30
FEB 2001		SEP 2001[(a)]	
Volume Extracted (gal)	1,578,090	Volume Extracted (gal)	758,199
Volume Extracted (L)	5,973,071	Volume Extracted (L)	2,869,783
Total VOC (µg/L)	418	Total VOC (µg/L)	410
Total VOC Removed (kg)	2.50	Total VOC Removed (kg)	1.18
MAR 2001		OCT 2001[(a)]	
Volume Extracted (gal)	1,919,520	Volume Extracted (gal)	0
Volume Extracted (L)	7,265,383	Volume Extracted (L)	0
Total VOC (µg/L)	460	Total VOC (µg/L)	0
Total VOC Removed (kg)	3.34	Total VOC Removed (kg)	0
APR 2001		NOV 2001[(a)]	
Volume Extracted (gal)	1,810,680	Volume Extracted (gal)	1,298,796
Volume Extracted (L)	6,853,424	Volume Extracted (L)	4,915,943
Total VOC (µg/L)	416	Total VOC (µg/L)	565
Total VOC Removed (kg)	2.85	Total VOC Removed (kg)	2.78
MAY 2001		DEC 2001	
Volume Extracted (gal)	2,015,235	Volume Extracted (gal)	2,299,882
Volume Extracted (L)	7,627,664	Volume Extracted (L)	8,705,053
Total VOC (µg/L)	417	Total VOC (µg/L)	271
Total VOC Removed (kg)	3.18	Total VOC Removed (kg)	2.36
JUN 2001		1 JAN – 31 DEC 2001	
Volume Extracted (gal)	2,085,465	Volume Extracted (gal)	18,629,335
Volume Extracted (L)	7,893,485	Volume Extracted (L)	70,512,033
Total VOC (µg/L)	327	Total VOC Removed (kg)	28.3
Total VOC Removed (kg)	2.58	Total VOC Removed (lb)	62.5
JUL 2001			
Volume Extracted (gal)	1,242,630		
Volume Extracted (L)	4,703,355		
Total VOC (µg/L)	471		
Total VOC Removed (kg)	2.22		

(a) The groundwater extraction and treatment system was shut down by direction of the Naval Air Station Brunswick Commanding Officer and relayed by Tony Williams at 1119 on 11 September 2001 as a result of the terrorist attacks, and restarted on 13 November 2001.

NOTE: VOC = Volatile organic compounds. Flow totals obtained from operational data presented in monthly operational reports for the groundwater extraction and treatment system. Total VOCs represent the sum of the 9 individual VOCs analyzed by U.S. Environmental Protection Agency Method 8010. Total VOC removal was calculated assuming each monthly sampling data for total VOC data represent groundwater quality for that entire month.

TABLE 2-3 SUMMARY OF AQUEOUS DIFFUSION PILOT STUDY – MONITORING EVENTS 18 AND 19, 2001

Monitoring Well (Well Type/Depth)	Pilot Study Group	Diffusion Sampler Interval with Higher Total VOCs in Monitoring Event 18	Summary of Monitoring Event 18 Diffusion Sampler Total VOC Concentration Study Results[a]	Diffusion Sampler Interval with Higher Total VOCs in Monitoring Event 19	Summary of Monitoring Event 19 Diffusion Sampler Total VOC Concentration Study Results[a]
MW-1104 (Perimeter/Shallow)	2	All levels similar	Low VOCs detected (1 μg/L)	Mid-point	Moderate VOCs reported in samples (8 μg/L)
MW-105A (Perimeter/Deep)	1	None	No VOCs detected	None	No VOCs detected
MW-205 (Interior Plume/Deep)	1	Deep	Moderate VOCs detected (277 μg/L)	Deep	High VOCs detected (468.8 μg/L)
MW-NASB-212 (Perimeter/Deep)	1	Shallow	Moderate VOCs detected (16 μg/L)	Shallow	Moderate VOCs detected (7.7 μg/L)
MW-224 (Perimeter/Shallow)	1	Mid-point	Low VOCs detected (< 5 μg/L)	All levels similar	No VOCs detected
MW-225A (Perimeter/Deep)	2	Shallow	Moderate VOCs detected (23.3 μg/L)	Mid-point	Moderate VOCs detected (<60 μg/L)
MW-229A (Perimeter/Deep)	1	Mid-point	Moderate VOCs detected (83 μg/L)	Mid-point	Low VOCs detected (<2 μg/L)
MW-230A (Sentinel/Deep)	2	Mid-point and deep	Low VOCs detected (< 5 μg/L)	All levels similar	No VOCs detected
MW-231A (Sentinel/Deep)	2	All levels similar	Low VOCs detected (< 5 μg/L)	All levels similar	No VOCs detected
MW-231B (Sentinel/Shallow)	2	Mid-point and deep	Low VOCs detected (< 5 μg/L)	Deep	Moderate VOC detected (53 μg/L)
MW-303 (Sentinel/Deep)	2	All levels similar	No VOCs detected	Shallow	Low VOC detected (3 μg/L)
MW-305 (Sentinel/Deep)	2	Mid-point and deep	Moderate VOCs detected (<8 μg/L)	All levels similar	No VOCs detected
MW-306 (Perimeter/Deep)	1	Deep	High VOC detected (408.6 μg/L)	Deep	High VOC detected (257 μg/L)
MW-308 (Sentinel/Bedrock)	2	Mid-point	Moderate VOCs detected (8 μg/L)	All levels similar	No VOCs detected
MW-309B (Sentinel/Bedrock)	2	All levels similar	Low VOCs detected (< 5 μg/L)	All levels similar	No VOCs detected
MW-311 (Interior Plume/Deep)	1	Deep	Moderate VOCs detected (308 μg/L)	Deep	Moderate VOCs detected (314 μg/L)
MW-313 (Sentinel/Shallow)	2	Mid-point and deep	Moderate VOCs detected (<6 μg/L)	Mid-point and deep	Moderate VOCs detected (<7 μg/L)
MW-318 (Sentinel/Shallow)	2	Shallow and deep	Moderate VOCs detected (<6 μg/L)	All levels similar	No VOCs detected
MW-319 (Interior Plume/Deep)	1	Deep	Moderate VOCs detected (91 μg/L)	Deep	Moderate VOCs detected (55.7 μg/L)
MW-330 (Sentinel/Deep)	2	Shallow	Moderate VOCs detected (8 μg/L)	All levels similar	No VOCs detected
MW-331 (Interior Plume/Deep)	1	Mid-point	High VOCs detected (500.7μg/L)	Mid-point	High VOCs detected (1,336 μg/L)
MW-332 (Interior Plume/Shallow)	1	Mid-point	Moderate VOCs detected in sample (204 μg/L)	Mid-point	Moderate VOCs detected (55 μg/L)
MW-333 (Sentinel/Deep)	2	Shallow and mid	Low VOCs reported in samples (<4 μg/L)	Mid-point and deep	Low VOCs detected (<4 μg/L)
MW-334 (Sentinel/Deep)	2	Mid-point and deep	Low VOCs reported in samples (<1 μg/L)	Mid-point	Low VOCs detected (<1 μg/L)
P-132 (Sentinel/Shallow)	2	Deep	No VOCs detected	All levels similar	No VOCs detected

(a) High concentration – >400 μg/L, moderate contamination from 400 to 5 μg/L, and low contamination – <5 μg/L.

NOTE: VOC = Volatile organic compound.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 SUMMARY OF GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PERFORMANCE

Trends and conclusions based on data collected as part of the Long-Term Monitoring Program include the following:

- **General**

  — The VOC removal rates from the Eastern Plume decreased from approximately 3.5 kg per month in 2000 to approximately 2.36 kg per month in 2001.

  — The mass of VOCs removed by the groundwater extraction system decreased from 42 kg in 2000 to 28.3 kg in 2001. Part of this decrease is due to the 63 day-long extraction system shutdown following the events of 11 September.

  — Extraction well EW-5 was deactivated in January 2001, and replaced with EW-5A. The new extraction well is screened across the deep sand interval.

- **EW-01**

  — Reduced pumping rates at EW-01 were noted during 2001 resulting from increased iron fouling of this well. The well was shut down in April, and redeveloped and restarted in May 2001, resulting in improved flows and reduced iron content. On 1 July, shut down of EW-01 occurred due to a lightning strike. The well was left off until late August due to continued iron fouling. Pumping rates were gradually increased through early September until shutdown on 11 September. By the end of the year, the rate had been gradually increased to 9 gpm. The average annual pumping rate for the well was 5.4 gpm.

  — The total VOC influent concentrations detected in groundwater samples collected from EW-01 (screened from 11.2 to -66.8 ft mean sea level) continue to have a similar order of magnitude compared with total VOC concentrations detected in groundwater samples from nearby monitoring point MW-229A, which is screened exclusively in the deep interval (screen interval from -21.4 to -31.4 ft mean sea level). This similarity in total VOC concentrations suggests the deep groundwater being withdrawn by EW-01 does not appear to be greatly diluted by groundwater extracted from the shallow interval.

- **EW-02A**

  — The average annual flow for EW-02A in 2001 was 18.4 gpm, which is comparable to the 2000 average of 18.5 gpm. No significant operational problems were noted in EW-2A during 2001. EW-2A is screened in the deep and confined portion of the overburden aquifer, and water elevation data indicate a cone of depression surrounding EW-2A is at least 200 ft in diameter.

- **EW-04**

  — Pumping rates increased at EW-04 during 2001 compared with 2000, ranging from 18.0 to 22.0 gpm. The average pumping rate for 2001 was 19.3 gpm, an increase from the 2000 average of 14.6 gpm. Flow rates were gradually increased from August through December to increase treatment plant throughput.

  — Although EW-04 is screened across both the shallow and deep intervals, there are no deep groundwater sampling locations near EW-04 that can be used as a comparison to assess the extent of dilution that may be occurring between the deep and shallow groundwater zones at extraction well EW-04.

- **EW-05**

  — Extraction well EW-05 was decommissioned in January 2001 following the installation of EW-05A.

- **EW-05A**

  — To improve VOC removal rates in the northern area of the Eastern Plume, replacement extraction well EW-05A was installed in September 2000 approximately 20 ft from EW-05, and activated in January 2001. EW-05A is screened across the lower sand interval just above the clay layer. EW-05A was placed online in January 2001 and did not have any significant operational problems during 2001. The average annual flow rate at EW-05A in 2001 was 8.49 gpm.

3.2 SUMMARY OF WATER LEVEL GAUGING PROGRAM

3.2.1 Groundwater Flow—General Observations

Observations based on data collected as part of the Long-Term Monitoring Program include:

- Despite the 63 day-long shutdown of the groundwater extraction system, groundwater flow patterns are very similar to those observed in 2000 and in previous years. Significant changes were noted in potentiometric head elevations resulting in localized flow pattern changes at some monitoring area (discussed further below). However, no major regional changes have occurred in groundwater flow patterns at these sites based on the gauging completed during 2000.

- As with previous years, the interpretive shallow groundwater contour maps (figures are included in the Monitoring Events 18 and 19 reports) indicate the predominant potential of groundwater flow is to the south-southeast, generally toward Mere Brook and Merriconeag Stream. Consistent with historic data, groundwater flow is strongly influenced by Mere Brook and its tributary. Groundwater flow patterns are similar to previous years.

- Groundwater elevation data from the October 2001 gauging event (completed while the extraction system was not running) show the following differences:

  — The groundwater elevation measured in EW-1 is notably higher than in the previous monitoring event (approximately 6 ft higher). This is the result of the treatment system shutdown during the October gauging round.

  — Surface water elevations measured in October at stream gauges GP-1A, GP-2A, and GP-3A were lower than those measured in March 2001 by approximately 5 ft. This difference is likely due to seasonal changes in the elevation in the picnic pond due to drought conditions, and is not believed to be related to the shutdown of the groundwater extraction system.

  — Surface water elevations measured in October at stream gauge GP-6 were higher than those measured in March 2001 by approximately 9 ft. This difference is likely due to changes in the elevation of the lower reach of Mere Brook, possibly due to tidal conditions at the time elevation data were collected. This change is not believed to be related to the shutdown of the groundwater extraction system during October 2001.

- Consistent with historic data, the interpretive deep potentiometric contour maps indicate that the predominant groundwater flow potential for the main portion of the Eastern Plume is generally toward the south-southeast (figures are provided in the monitoring event reports). Gauging data collected east of Mere Brook indicate groundwater flow to the west. The general groundwater flow patterns are consistent with previous gauging results.

- Groundwater immediately south of Mere Brook (near MW-230A and MW-231A) has been interpreted to flow to the northeast in previous monitoring event reports. This has been confirmed by data collected from four new piezometers gauged in October 2001 (PZ-1, PZ-2, PZ-6, and PZ-11). Data from these new piezometers indicate a northeasterly flow potential may be present in the southern boundary areas of the Eastern Plume.

3.2.2 Effects of Remedial Measures—Sites 1 and 3

- A comparison of water elevation data collected prior to emplacement of the slurry wall in March 1995 and subsequent long-term monitoring gauging data indicates that water elevations have decreased significantly within the landfill (Figure 2-1). Water surface elevations within the landfill have stabilized and have not shown significant rebound after cessation of pumping from EW-06 and EW-07 in November 1997.

- Groundwater is below the known bottom elevation of waste material within the landfill at monitored locations within the Sites 1 and 3 landfill, with the exception of MW-234R (Figure 2-2). At this location, waste material was saturated in 2001, which is not consistent with water elevation data collected during previous years. During 2001, water elevations continued to decline, indicating the slurry wall has effectively reduced groundwater elevations and prevented contact with waste material in the Sites 1 and 3 landfill. Based on the comparison to waste and water elevations, the landfill cap and slurry wall are successfully minimizing the saturation of waste within the Sites 1 and 3 landfill.

- Similar to previous years, data from 2001 indicate potentiometric heads in the shallow and deep monitoring wells downgradient of the landfill in the vicinity of the Weapons Area Compound and Mere Brook show a trough in water elevations. The interpreted 21-ft contour potentiometric surface lines in the deep interval downgradient of the landfill are deflected toward the southern end of the Sites 1 and 3 landfill. This is attributed to the presence of the low permeability cap and previous groundwater extraction activity, in addition to the slurry wall at Sites 1 and 3 landfill that have acted to limit infiltration and groundwater movement in the capped area. The presence of these remedial structures has resulted in an area of lower head downgradient of Sites 1 and 3.

3.2.3 Effects of Remedial Measures—Eastern Plume

The localized effects of the remedial measures at the Eastern Plume are measured primarily by observing the cone of depression near each extraction well. Due to the extraction system shutdown between 11 September and 13 November 2001, effects of the remedial system cannot be documented for the second half of 2001. However, the extraction system shutdown provided an opportunity to observe the shallow and deep aquifers under non-pumping conditions, after a prolonged shutdown of the extraction system. Notable differences during Monitoring Event 19 include the following:

- A comparison of water elevations measured between the April and October 2001 events in the shallow and deep intervals was not significantly different. Variations in water elevations were generally 1-2 ft different, which is likely attributable to seasonal fluctuations, and do not appear to be related to the extraction system shutdown.

- Water elevations at MW-311 and EW-2A increased approximately 13 ft following the cessation of pumping. Artesian conditions were observed at EW-2A (which were present before pumping from EW-2/EW-2A began). This suggests that groundwater elevations reached pre-extraction well equilibrium conditions during the extraction system shutdown. Based on this observation, it is likely that the October 2001 flow patterns in the deep interval can be considered as non-pumping equilibrium conditions.

- With the extraction wells off, a groundwater mound was observed at EW-1 in the shallow interval. This indicates that groundwater was likely to be flowing inside the well casing from the deep aquifer into the shallow flow system.

- These data are considered to be anomalous (possibly the result of field measurement error or transcription error) and are not considered to be reliable. Flow from the upper sand through the transition unit (as suggested by these data) is not considered to be likely given the low permeability of the transition unit and general upward flow gradient noted between shallow and deep intervals.

Based on the April 2001 data, the following observations can be made:

- The cone of depression in the shallow interval near the extraction wells cannot be directly measured due to limited data points in the shallow intervals near the extraction wells. Of these extraction wells, EW-2A and EW-5A are screened solely in the deep portion of the transition unit, and drawdowns in the shallow interval are expected to be limited. However, the cone of depression within the shallow interval can be inferred at approximately 75-100 ft (horizontal distance) at EW-01 and EW-04, based on the measured shallow drawdown documented in the vicinity of EW-05 in a previous monitoring event report (i.e., Figure 7 in the Monitoring Event 17 report).

3.3 SUMMARY OF GROUNDWATER MONITORING AND SAMPLING PROGRAM

3.3.1 Sites 1 and 3

3.3.1.1 Inorganic Compound Concentrations and Distribution

Samples collected from shallow monitoring well MW-217B during 2001 detected concentrations of inorganics above State MEGs and/or Federal MCLs with similar concentrations as have been noted in historical data. The reported concentrations of inorganics at this monitoring well are attributed to the location of this well within the confines of the Sites 1 and 3 landfill.

Concentrations of inorganic analytes were detected outside of the Sites 1 and 3 landfill during 2001, as noted below:

- Manganese was detected above the State MEG (200 µg/L) and Federal MCL (50 µg/L) in groundwater samples collected from MW-202A and MW-218 and MW-240 during 2001. Previous sampling events have reported similar concentrations of manganese exceeding State MEG or Federal MCL.

- Arsenic exceeded the corresponding Federal MCL (50 µg/L) in the groundwater samples collected from monitoring well MW-218 during 2001, which is consistent with previous data. Concentrations of arsenic detected during 2001 fall within the historical range, and appear to be increasing since 1999. Dilution calculations (Appendix C from the Sites 1 and 3 and Eastern Plume 1999 Annual Report [EA 2000d]) indicate groundwater discharge from this portion of the aquifer will be significantly diluted by flow in Mere Brook (dilution factor estimated to be 22-933 times). Therefore, observed groundwater concentrations of contaminants entering Mere Brook are likely to be significantly diluted compared with groundwater concentrations detected at MW-218.

- Aluminum was detected above the Federal MCL of 200 µg/L in monitoring wells MW-217B, MW-218, MW-219, and MW-240 during 2001. Concentrations of aluminum detected at these wells during 2001 fall within the historical range, and the presence of aluminum in groundwater is likely to be related to naturally occurring conditions.

3.3.1.2 Volatile Organic Compound Concentrations and Distribution

Vinyl chloride was detected above the State MEG and Federal MCL at 1 well (MW-217B during 2001). This VOC is the primary contaminant of concern at Sites 1 and 3. This result is consistent with previous data collected during the Long-Term Monitoring Program, and vinyl chloride in MW-217B has shown a generalized decreasing concentration trend since December 1997.

Samples collected from shallow monitoring wells MW-203, MW-204, and MW-240 and deep monitoring wells MW-218 and MW-219, located downgradient of the landfill, did not contain concentrations of VOCs above State MEGs or Federal MCLs during 2001. This is consistent with data collected in previous years. The lack of VOC exceedances at these locations suggests that the slurry wall and low permeability cap in place at Sites 1 and 3 are effectively preventing the transport of VOC-impacted groundwater outside the landfill area.

Samples collected from shallow well MW-202A, located hydraulically crossgradient to the opening of the slurry wall surrounding the landfill, have detected concentrations of VOCs above the State MEGs and/or Federal MCLs. Concentrations of total VOCs in groundwater samples at MW-202A have decreased from approximately 1,900 µg/L in Monitoring Event 1 to approximately 9.2 µg/L in Monitoring Event 19. The concentrations of VOCs at this monitoring well indicate that installation of the slurry wall has decreased the migration of VOCs significantly.

3.3.2 Eastern Plume

3.3.2.1 Volatile Organic Compound Concentrations and Distribution

Trichloroethene and tetrachloroethene were the VOCs most commonly reported above State MEGs and Federal MCLs at interior plume monitoring wells and perimeter monitoring wells, which is consistent with previous long-term monitoring data.

Shallow Monitoring Wells

- Consistent with previous monitoring event results, samples collected from shallow monitoring wells detected limited exceedance of State MEGs and Federal MCLs in 2001.

- Historical concentration data collected at monitoring well MW-1104 contained VOCs above regulatory concentrations, although samples during 2001 did not note an exceedance for VOC. This suggests the VOC plume has degraded or otherwise attenuated in the inferred source area of the Eastern Plume.

- Data from monitoring well MW-332 indicate concentrations of trichloroethene were detected above the MEG and MCL in the mid-depth diffusion sampler. The shallow interval near MW-332 is believed to have been caused by artesian flow of groundwater at MW-311 between 1991 and 1995. No other exceedances of the MEG or MCL criteria for VOCs were detected in this monitoring well during 2001. This represents a decrease in the number of VOCs detected above regulatory standards at this monitoring well, and may indicate natural attenuation is breaking down VOCs in the shallow groundwater at this location. Additional monitoring rounds will be required to confirm this hypothesis.

- Data from Monitoring Event 19 indicate that trichloroethene and tetrachloroethene were detected above regulatory criteria in the deep diffusion sampler in monitoring well MW-231B. The other two diffusion samplers, and the low-flow sample collected from this well during the same monitoring event, did not indicate that these VOCs were present. The detection of VOCs above regulatory standards has not been noted previously at this location. However, it is suspected that samples from MW-231B and MW-229A appear to have been switched during the field sampling program. To identify this error, a note will be placed in the site database so the reader is aware that sample results for these monitoring wells have been switched. This note will also be placed on the trend graphs.

- Data collected from MW-313 show an increase in total VOCs, specifically 1,1-dichloroethane and 1,1-dichloroethene between 1998 and 2001. The VOCs noted in this well are daughter compounds likely derived from the parent compounds that comprise the majority of the Eastern Plume (i.e., 1,1,1-trichloroethane and trichloroethene). Based on these results, it appears that dechlorination is occurring upgradient of, or in, the shallow interval.

Deep Monitoring Wells

- VOC concentrations detected in samples collected from deep monitoring wells in the Eastern Plume indicate the area of impacted groundwater extends from the vicinity of MW-NASB-212 in the northern portion of the plume to monitoring well MW-229A in the southern portion of the plume. These data are consistent with previously collected data gathered since 1995.

- During 2001, the area of the Eastern Plume above State MEGs and/or Federal MCLs has not changed significantly based on data collected from interior plume wells and perimeter monitoring wells as part of the Long-Term Monitoring Program:

  — In general, samples from monitoring points that have reported concentrations of VOCs above State MEGs or Federal MCLs consistently exceed these regulatory criteria in data collected as part of the Long-Term Monitoring Program.

  — Similarly, samples from monitoring points reporting concentrations below the State MEGs and/or Federal MCLs are consistently detected below regulatory criteria.

  — These results suggest that the main portion of the Eastern Plume (i.e., the area above regulatory criteria) has not moved significantly since the Long-Term Monitoring Program started in 1995. Based on existing data, the main portion of the Eastern Plume appears to be relatively stationary and is not migrating at a significant rate toward the south.

- Trend data collected between 1995 and 2001 indicate total VOC concentrations have continued to decrease at monitoring points MW-311 and MW-NASB-212. These declining VOC concentrations are likely the result of natural groundwater flow, dilution, and natural attenuation, which may include dechlorination, diffusion, dispersion, and VOC migration. Extraction well EW-02A has effectively reduced VOC concentrations near MW-311 by approximately 2-3 orders of magnitude since pumping was initiated in June 1998. Trend data suggest that VOC concentrations appear to be stabilizing (i.e., becoming asymptotic) at approximately 300 µg/L.

- Samples from five monitoring wells located along the leading edge of the Eastern Plume show an increase in total VOC concentrations based on data collected in the past 2-3 years (MW-225A [deep], MW-230A [deep], MW-313 [shallow], MW-333 [deep], and MW-334 [deep]). The increase in VOC concentrations at MW-313, MW-333, and

MW-334 is of particular interest as these wells are located in the southeast portion of the Eastern Plume. These results indicate consistent increases in VOC concentrations of the leading edge of the plume, although concentrations remain below State MEGs and Federal MCLs. It is likely that concentrations have been increasing due to the movement of VOC-impacted groundwater toward Mere Brook.

- Samples from deep monitoring wells MW-NASB-212, MW-229A, and MW-306 (all perimeter wells) and from wells MW-311 and P-106 (both interior plume wells) show stable or decreasing VOC trends based on the data collected during the Long-Term Monitoring Program.

- Groundwater samples collected from shallow and deep sentinel wells (MW-231B, MW-313, MW-318, MW-230A, MW-231A, MW-303, MW-305, MW-333, MW-334, MW-308, MW-309B, and P-132) did not detect VOCs above State MEGs or Federal MCLs.

3.4 SUMMARY OF SURFACE WATER, SEDIMENT, AND SEEP SAMPLING PROGRAM

3.4.1 Surface Water

3.4.1.1 Sites 1 and 3

Based on samples collected during 2001, the following are noted:

- Three VOCs (carbon disulfide, chloroform, and acetone) were detected at nominal concentrations in surface water samples collected from Mere Brook during 2001. The results reaffirmed that VOCs from Sites 1 and 3 do not appear to be significantly impacting surface water.

- Surface water location SW-07 showed an increase in lead concentrations from 1995 through 1999. However, lead was not detected at concentrations within historical ranges during 2001.

3.4.1.2 Eastern Plume

Based on samples collected during 2001, the following are noted:

- Four VOCs (2-butanone, toluene, xylene, and acetone) were detected in surface water samples collected from Mere Brook and Merriconeag Stream during 2001. Concentrations of these compounds were low. Although the presence of these compounds in surface water may indicate that the Eastern Plume is impacting surface water, as has been noted in previous work by EPA. The highest concentrations of VOCs are noted at SW-13 during sampling completed in 2001. However, historically, the analytical data from the long-term monitoring of the onsite surface water during 2000 indicate that VOCs from the Eastern Plume do not appear to be significantly impacting surface water.

3.4.2 Sediment

Based on data collected during 2001, the following are noted:

- Inorganic concentrations in sediment remained within historical ranges during 2001.

3.4.3 Leachate Station Seeps

3.4.3.1 Sites 1 and 3

Based on data collected during 2001, the following are noted:

- SEEP-02 has been dry since Monitoring Event 2; this is likely attributable to emplacement of the slurry wall and extraction wells at Sites 1 and 3.

- SEEP-04 samples showed an increasing trend in total VOCs in 2001. However, a trend for total VOC concentrations has been increasing since April 1997, with the largest increase in concentration detected in 1999.

- Concentrations of VOCs at SEEP-09 were within historical ranges for individual VOCs.

3.4.3.2 Eastern Plume

Based on data collected during 2001, the following is noted:

- Two seeps (SEEP-10 and SEEP-11) were identified by MEDEP and samples were collected during 2000 and 2001. No VOCs were detected at either sample location since monitoring was initiated at these locations.

3.4.4 Leachate Station Sediment, Sites 1 and 3

Based on samples collected during 2001, the following are noted:

- In general, the highest VOC concentrations of analytes of concern were detected in sediment collected at LT-1 and LT-9.

- Leachate sample location LT-1 showed a large increase in total VOC concentrations in Monitoring Event 19 compared to previous sampling events, largely related to the detection of 1,500 µg/L of 2-butanone. Similar spikes in VOC concentrations have been noted at other leachate sample locations in the past, although long-term trends have not been identified. The reason for the noted increase in 2-butanone concentrations is unknown.

- Mercury was reported above the cleanup criteria (1 mg/kg) in two sample locations during 2001 (LT-1, 1.2 mg/Kg – Monitoring Event 18 and 1.3 mg/Kg – Monitoring Event 19; LT-4, 3.6 mg/Kg – Monitoring Event 18).

- Large variations between monitoring events were noted in VOCs, and inorganic sample results are likely attributed to the heterogeneous nature of the sediment matrix.

- Acetone was detected from several leachate sampling locations during 2001 sampling. This is consistent with previous sampling data. Based on Long-Term Monitoring Program results, acetone appears to be present in the subsurface, and may be upwelling at these locations.

- No definitive trend is noted in the detected concentrations of leachate station sediment inorganic analytes.

3.5 SUMMARY OF LANDFILL INSPECTION AND MONITORING PROGRAM

3.5.1 Landfill Inspection

Visual inspection of the Sites 1 and 3 landfill was conducted in conjunction with the two monitoring events completed during 2001. The visual inspection of the landfill cap in April 2001 noted minor animal burrows in the vicinity of MW-217A. The animal burrows did not require repair. There was no evidence of erosion or exposure of the geotextile cover during 2001 and the cap of the landfill appeared to have no problems that required repairs.

3.5.2 Landfill Gas Monitoring Program

Based on data collected during 2000, the following observations were noted:

- Recorded pressures at each of the gas vents/probes were consistent with atmospheric pressure. Methane vapors were detected at minimal concentrations during 2001. Methane production within the landfill appears to be limited based on these measurements, and methane gas migration within the landfill appears to be minimal.

- Percent oxygen measurements were at or near average atmospheric concentrations of 20 percent at the gas probes and gas vents monitored during 2001. There are no discernable trends evident in percent oxygen and percent carbon dioxide values noted at gas probe/vent locations that may indicate changes in microbial activity are occurring within the landfill.

3.6 CONCLUSIONS AND RECOMMENDATIONS

Based on the data generated as part of the Long-Term Monitoring Program, the following conclusions and recommendations are made by EA to the Navy based on analysis of data collected during the Long-Term Monitoring Program to improve the effectiveness of the monitoring network and remedial systems.

3.6.1 Groundwater Sampling Program

Conclusion—The increasing concentrations of VOCs in the shallow and deep intervals (noted at monitoring wells MW-231B, MW-230A, MW-334, MW-333, and MW-313) suggest the Eastern Plume is slowly migrating into the vicinity of New Gurnet Road. Concentrations at these monitoring points have been slowly increasing in the last 1-3 years, suggesting that VOC migration is occurring slowly, possibly as the result of diffusion and/or dispersion, in addition to groundwater movement to the south-southeast. This plume movement is not unexpected as groundwater flow potentials from the main portion of the Eastern Plume suggest VOC-impacted groundwater is likely to move to the south-southeast over time. The relatively slow movement of groundwater suggests that sand units conducting the VOC plume have limited hydraulic connectivity, and the plume movement is likely limited to some degree by site geological conditions.

Recommendation—Based on observations noted above, EA recommends the installation of up to 3-5 monitoring wells downgradient of the Eastern Plume to monitor potential plume movement to the south. An investigation is planned for 2002 in the southern boundary region that will include installation of seven borings and up to four monitoring wells to assess whether the VOC plume extends into the southern boundary region. The location of these monitoring wells should be positioned so they can act as sentinel wells along the downgradient edge of the Eastern Plume. In addition, installation of two shallow wells, possibly at the same location as the proposed deep wells, are recommended for areas south of MW-231B and MW-313 to assess the extent of VOC impact in the upper portion of the unconsolidated aquifer. The location of monitoring wells will be discussed with MEDEP and EPA after the soil boring portion of the effort is completed. The geologic conceptual model of the Eastern Plume will be revised, if necessary, after these data are collected so that the fundamental hydrogeologic conditions known to exist at the site can be used to guide data interpretation.

Conclusion—Concentration trends from monitoring wells located within the body of the Eastern Plume appear to be relatively stable with time, suggesting limited migration of the VOC plume during the period in which long-term monitoring has been conducted.

Recommendation—Continue to collect groundwater samples as specified in the most current revision of the LTMP (EA 2000a). Begin discussions with the project Technical Evaluation Group and regulators for optimization of the Eastern Plume sampling network to determine which sampling points may be candidates for yearly sampling (as opposed to the current twice per year sampling), or which points are determined to be redundant and can be eliminated from the program. In addition, these discussions could also be used to assess if other monitoring points are needed to track movement of the hotspot areas within the Eastern Plume.

Conclusion—Data from wells near the source areas of the Eastern Plume (MW-1104 and MW-224) have dropped significantly since monitoring was initiated in 1995, suggesting that the trailing edge of the plume is shrinking. These data indicate that the removal actions completed at Site 11 (the primary source area of the Eastern Plume) were successful in removing the VOC source. Continued plume contraction along the leading edge is anticipated.

Recommendation—Continue to track groundwater VOC concentrations along the leading edge of the plume. Redefine the plume boundary in future reports as needed to accurately define the plume boundary.

3.6.2 Extraction System

Based on the data collected during the Long-Term Monitoring Program, the following conclusions and recommendations are provided for Navy consideration.

Conclusion—The extraction well network appears to have limited effectiveness at maintaining hydraulic control of the Eastern Plume (which appears to be contained due to geological conditions at the site) but has been effective at reducing VOC concentrations in specific areas.

Recommendation—Consideration should be given to changing the remedial approach for the Eastern Plume from pump-and-treat to natural attenuation. Pump-and-treat activities are useful for reducing hotspots of VOCs, and use of the existing pump-and-treat system is useful for removal of VOC mass. Recommendations for establishing the basic data necessary to proceed toward natural attenuation remedy include the following:

- Develop criteria that can be used to assess the degree of natural attenuation of chlorinated VOCs within the Eastern Plume and present them for discussion with members of the Technical Evaluation Group and regulators. As a starting point for this discussion, the Navy protocol for use of natural attenuation is suggested as the default evaluation criteria. Following these discussions, agree upon sampling protocols necessary to collect natural attenuation parameters and begin collection of data related to natural attenuation indicator parameters.

- Assess the potential for using monitored natural attenuation remedy at the Eastern Plume. It is recommended that a monitored natural attenuation program for the Eastern Plume be developed and incorporated into the Long-Term Monitoring Program in conjunction with MEDEP and EPA. The results of the monitored natural attenuation program will be evaluated in order to: (1) assess the overall distribution of apparent trends within the dissolved contaminant mass, and (2) assess whether site conditions are conducive to promoting monitored natural attenuation as a viable remedial option for the Eastern Plume.

Conclusion—Extraction well EW-2A has reached the limit of VOC removal that can be achieved at this location. This well was very effective in decreasing the VOC hotspot near MW-311 from a high of approximately 20,000 μg/L total VOC since 1998 to 314 μg/L in 2001. Following the 3-month long plant shutdown between September and November 2001, VOC influent concentrations did not increase (i.e., no rebound effect was observed following the cessation of groundwater extraction). The trend graphs for this well and for MW-311 suggests that a significant mass of VOCs is no longer present in this portion of the Eastern Plume.

Recommendation—EW-2A should be considered for decommissioning and/or conversion into a monitoring point with potential future use as an extraction well, if needed.

Conclusion—Groundwater elevation data collected at EW-01 during the plant shutdown show groundwater movement from the deep interval to the shallow interval at this location. This well is screened across the deep and shallow intervals of the unconsolidated interval, and appears to act as a conduit for potentially impacted groundwater to move into the shallow interval.

Recommendation—EA recommends abandonment of extraction well EW-01 as soon as possible to eliminate the potential for cross-aquifer contamination if pumping during groundwater extraction is interrupted. The replacement of this extraction well in the southern plume area should be considered to remove VOC mass prior to groundwater migration toward the southern boundary area.

REFERENCES

ABB Environmental Services (ABB-ES). 1992a. Record of Decision for a Remedial Action, Sites 1 and 3. Naval Air Station, Brunswick, Maine. June.

ABB-ES. 1992b. Record of Decision for an Interim Remedial Action, Eastern Plume Ground-Water Operable Unit. Naval Air Station, Brunswick, Maine. June.

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EA. 2000b. Summary of the April 2000 Aqueous Diffusion Sampling Pilot Study, Eastern Plume, Naval Air Station, Brunswick, Maine. June.

EA. 2000c. Summary of the September 2000 Aqueous Diffusion Sampling Pilot Study, Eastern Plume, Naval Air Station, Brunswick, Maine. November.

EA. 2000d. Final 1999 Annual Report, Monitoring Events 14 and 15, Sites 1 and 3 and Eastern Plume, Naval Air Station, Brunswick, Maine. May.

EA. 2002a. Monitoring Event 18 – April 2001. Sites 1 and 3 and Eastern Plume, Naval Air Station, Brunswick Maine. January.

EA. 2002b. Monitoring Event 19 – October/November 2001. Sites 1 and 3 and Eastern Plume, Naval Air Station, Brunswick Maine. May.

Appendix A

Response to
Maine Department of Environmental Protection
Comments on the Draft 2001 Annual Report

RESPONSE TO COMMENTS FROM
MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION
ON THE DRAFT SITES 1 AND 3 AND EASTERN PLUME 2001 ANNUAL REPORT
NAVAL AIR STATION, BRUNSWICK, MAINE

Commentor: Claudia Sait
Comment Issue Date: 4 February 2003 **Navy Response Date: 18 July 2003**
Comment Issue Date: 31 July 2003 **Navy Response Date: 30 October 2003**

4 February 2003—The Maine Department of Environmental Protection (MEDEP) has reviewed the draft report entitled *2001 Annual Report, Monitoring Event 18 and 19, Sites 1 and 3 and Eastern Plume, Naval Air Station, Brunswick, Maine*, dated December 2002, prepared by EA Engineering, Science, and Technology. Based on that review, the Department has the following comments and issues.

NOTE: Each of our comments are followed with a code that indicates whether a response is required (RR), no response is required (NR), editorial correction needed (ED); or meeting discussion requested (MTG). No response is required for editorial corrections unless the Navy disagrees with the correction.

31 July 2003—Just a couple of editorial comments: it would be preferable for the Navy or EA to date their responses since the date on this document is the date of MEDEP's comments and now they are being emailed there is no received date stamp. Also it is confusing to separate the original statement from MEDEP's comment because the original statement is not differentiated by quotation marks. This is basic grammar therefore, please add quotation marks around the original statement as copied from the draft report.

GENERAL COMMENTS

1. Due to the terrorist attacks on September 11, 2001, the Navy restricted contractor's access onto BNAS consequently the Groundwater Extraction and Treatment Systems for the Eastern Plume was shut down prior to the September sampling event. It was decided that the extraction wells would remain off until the fall field sample collection could be completed. The result was that sampling was concluded and the pumps were restarted 63 days later on November 13, 2001. A benefit of the delayed sampling event was to learn to what degree the plume would rebound, both hydraulically and chemically, after an unanticipated shutdown period of several weeks. (NR)

   Response—Comment noted.

2. This annual report does not include a figure that shows the locations of monitoring points that comprises the long-term monitoring network. Instead, the Navy references Figure 2 of the monitoring event reports. This annual report should be able to stand alone without having to refer to other documents for something this basic. Please include the monitoring event Figure 2 in this and all future reports. (ED)

Response**—**Comment noted. Please see Figure A-7 (A-7 is Figure 2 from the monitoring event report). Since annual reports will no longer be generated as part of the Long-Term Monitoring Program, this figure will be included in the future Bi-Annual Monitoring Event Reports.

Comment on Response**—**My copy of the annual report does not include figure A-7. Should there be one? If not, it is unclear to me whether you are going to provide one. Please clarify.

Response**—**Figure 1-2 (originally Figure A-7) will be included in the final report.

SPECIFIC COMMENTS

3. ***Section 2.2, Water Level Gauging Program, Page 2-3, Last Paragraph*****—**"Water elevations in MW-311 were relatively consistent with previous data and show a slightly increasing trend."

   The increasing trend is not properly characterized as "slightly." The referenced graph shows water elevations in MW-311 fluctuated between 1.3 and 4.4 feet MSL in 1999, and then consistently rose to 8.5 feet MSL by the spring of 2001. This is a change of approximately 4 to 7 feet. When the pumps were off for two months following the September 11, 2001 shutdown, the water level rose another 11 feet. Therefore, the rise occurring prior to the shutdown is at least a third of the total documented rise, which does not seem "slight." This 1999 through spring 2001 raise correlates well with the long-term reduction of extraction well pumping (EW-1 and EW-2A) during this timeframe. Rather than try to subjectively define the rise in groundwater elevation, MEDEP suggests deleting the word "slightly" in the statement and adding the key information as outline above. Then readers can make their own judgement as to the significance of the increase. (ED)

   Response**—**Comment noted. The sentence will be amended to read:

   > *Water elevations in MW-311 were relatively consistent with previous data and show an increasing trend. Water elevations in MW-311 fluctuated between 1.3 and 4.4 ft MSL in 1999, and then rose to 8.5 ft MSL by the Spring of 2001. The water level rose 11 ft when the pumps were turned off for 2 months following the events of 11 September 2001.*

4. ***Section 2.6, Quality Assurance/Quality Control Procedures, Page 2-5*****—**Some statement(s) regarding the findings of the data quality reviews for monitoring Events 18 and 19 should be presented here. It should also be noted in the report if all the data collected were determined to be acceptable and usable without qualifications. (ED)

   Response**—**Comment noted. The following statements will be added to Section 2.6:

   > *The findings of the data quality review for Monitoring Events 18 and 19 indicate that the data collected were acceptable and usable. There were minor biases identified based on field/laboratory contamination, precision criteria, and accuracy criteria.*

5. ***Table 2-3, Summary of Aqueous Diffusion Pilot Study – Monitoring Events 18 and 19, 2001***—

   a. Please provide the basis for the given ranges of low, moderate, and high at the bottom of the table or in the text. The established ranges will affect the overall degree of agreement between Monitoring Events 18 and 19 regarding monitoring intervals. Most importantly, there needs to been further discussion of diffusion sampling in this report that draws upon this table. (RR)

      Response—The diffusion bags are set in each well at a depth interval selected on the basis of historical analytical results which indicate the presence of elevated levels of contaminants. The results and trends of the aqueous diffusion sampling have been discussed with site stakeholders subsequent to the issuance of the 2001 Annual Report, and a complete summary of site diffusion sampling results has been issued which provides the requested discussions.

   b. This table is cumbersome and difficult to use. Changes that would improve information presentation are: (1) re-order into pilot study group 1 and pilot study group 2, and (2) eliminate a lot of extra words in the table by making two columns to replace "Summary of Monitoring Event #, Diffusion Sampler Total VOC Concentration Study Results." In 1st column give the value measured without parenthesis; in the 2nd column give capital letter signifying Low, Moderate, or High. (ED)

      Response—Comment noted. These suggestions aimed to simplify Table 2-3 will be taken into consideration in preparation of the upcoming Monitoring Event Report.

6. ***Section 3.1, Summary of Ground-Water Extraction and Treatment System Performance, Page 3-1, EW-01***—"The total VOC influent concentration detected in ground-water samples collected from EW-01 (screened from 11.2 to –66.8 ft mean sea level) continue to have a similar order of magnitude compared with total VOC concentrations detected in ground-water samples from nearby monitoring point MW-229A, which is screened exclusively in the deep interval (screen interval from –21.4 to 31.4 ft mean sea level). These similarities in total VOC concentrations suggest the deep ground water being withdrawn by EW-01 does not appear to greatly diluted by ground water extracted from the shallow interval."

   The second paragraph essentially says that the similarity in total VOC concentrations between EW-01 and nearby MW-229A suggest that water pumped by EW-01 does not appear to be greatly diluted by groundwater extracted from the shallow part of the EW-01 screen. The 10-foot screen of MW-229A is located opposite the mid-section of the 78-foot screen of EW-01, not the bottom section. The chemical data from MW-229A cannot be used to assess dilution in EW-01 pumpage.

   Furthermore, when comparing the similarity between these wells, the contaminant pie charts (Figure 3-1) appear quite different in composition. According to this report, two compounds (PCE and TCE) were recorded in water pumped from EW-01 that were not found in MW-229A. The fact that the total VOCs for these wells are within the same order of magnitude does not preclude shallow groundwater dilution in EW-01. Additionally, the groundwater hydraulic gradient in this area is approximately 0.03 ft/ft, which is a significant gradient. In such settings, a pumped well draws most of its discharge from the upgradient side. MW-229A is not located within this upgradient sector, and is over 100 feet away and slightly downgradient. To summarize, chemical and hydraulic evidence does not support the Navy's premise of little to no shallow groundwater inflow into EW-01. Therefore, this paragraph should be deleted. (Also see comment #13.b) (ED)

Response—The Navy believes that the sentence is accurate as written. While compound proportions noted in these wells have some differences, this is not unexpected in a complex aquifer system.

Comment on Response—MEDEP stands by its original comment.

Response—This topic will be discussed during the December 2003 3-day Technical Meeting.

7. ***Section 3.1, Summary of Ground-Water Extraction and Treatment System Performance, Page 3-2, EW-02A***—"and water elevation data indicate a cone of depression surrounding EW-02A is at least 200 ft in diameter."

   While the cone of depression surrounding EW-2A is in the order of 200 feet in diameter, as implied, it is relatively narrow in terms of capturing the width of the Eastern Plume, which is approximately 1000 feet wide (Figure 10, Monitoring Event 18 report). The only other extraction well in the plumes southern lobe, EW-01, has a smaller radius of influence. (NR)

   Response—This sentence was not meant to be a comparison of the diameter of the extraction well's cone of influence to the width of the plume, but instead is noting the inferred size of this feature near EW-2A. No changes have been made to the report based on this comment.

8. ***Section 3.2.1, Ground-Water Flow – General Observations, Page 3-3, 3rd item under 2nd Bullet***—"Surface water elevations measured in October at stream gauge GP-6 were higher than those measured in March 2001 by approximately 9 ft. This difference is likely due to changes in the elevation of the lower reach of Mere Brook, possibly due to tidal conditions at the time elevation data were collected. This change is not believed to be related to the shutdown of the ground-water extraction system during October 2001."

   A change of 9 feet does not seem reasonable for the reasons given above. The maximum tidal change in Casco Bay at Portland during the April 13 to 18 gauging period was 9.6 feet; it was 6.6 feet over the October 29-30 gauging period. The greatest tidal difference if the maximum tidal stage occurred at one gauging event and the lowest tidal stage occurred at the other gauging event would be 8.1 feet. The time of day of the stream gauge reading is not recorded in the event reports, however it would be very unlikely that the difference would even approach 8 feet.

   Measured elevations at GP-6 for Monitoring Events 11-18 range between 4.46 and 6.42 feet MSL. The October 2001 value of 14.42 feet is almost impossible to conceive as valid. The gauge needs to be closely inspected for any physical changes. Is this installation within the stream channel, on its bank, several feet from the surface water. Does the gauge reflect groundwater head, or free stream elevation? The Navy needs to investigate and report this matter more thoroughly, as it may have significance. (RR)

Response—A review of the field gauging data forms and discussions with the field team leader indicate that the depth to surface water measured in October at stream gauge GP-6 was recorded in error at 0.80 ft below ground surface or 14.42 water table elevation. The recorded depth should have been 10.80 ft below ground surface or 4.42 water table elevation. Stream gauge point GP-6 was gauged on 5 September 2001 with depth to surface water measured at 10.78 ft, or 4.44 water table elevation, which is consistent with previous gauging events. Gauging point GP-6 is measured off the top of a concrete culvert down to the water level in Mere Brook stream. These data have been corrected in the site database.

9. ***Section 3.2.1, Ground-Water Flow – General Observations, Page 3-3, Last Bullet***—
"Ground water immediately south of Mere Brook (near MW-230A and MW-231A) has been interpreted to flow to the northeast in previous monitoring event reports. This has been confirmed by data collected from four new piezometers gauged in October 2001 ... Data from these new piezometers indicated a southeasterly flow potential may be present in the southern boundary area of the Eastern Plume."

   The first sentence says, "flow to the northeast." The second sentence says "this has been confirmed by data collected from the four new piezometers." The third sentence states that the "new piezometers indicate a southeasterly flow potential may be present." This appears to be a contradiction please correct. (Please check your spelling of piezometer.) (ED)

   Response—The last bullet on Page 3-3 will be revised to read:

   > *Data from these new piezometers indicate a northeasterly flow potential may be present in the southern boundary areas of the Eastern Plume.*

   Comment on Response—The new piezometer data appears to represent shallow groundwater, and perhaps not deep groundwater. The well installation work in progress in 2003 should provide the data to definitively answer this disagreement.

   Response—Comment noted.

10. ***Section 3.2.3, Effects of Remedial Measures – Eastern Plume, Page 3-4, 1st Paragraph***:

    a. "The idle effects of the remedial measures at the Eastern Plume are measured primarily by observing the cone of depression near each extraction well."

       The size and shape of drawdown cones are important to monitor when initially starting up an extraction system and periodically to assure that plume capture remains optimal. However, the most important indicator of remediation success is the reduction of contaminant concentrations within the plume, and shrinkage of plume expanse. MEDEP believes that this is particularly true for the Eastern Plume, where remedial pumping has not resulted in groundwater elevation contours enclosing the plume, and therefore, drawdown due to pumping is not eliminating all possibility of plume escape downgradient. Please delete this sentence. (ED)

Response—The sentence is meant to indicate that the ongoing remedial measures at the Eastern Plume can be measured by the cone of depressions formed at each extraction well. This is not a false statement. The word "localized" will be added to the sentence that will act to bracket the limited intent of the sentence:

> *The **localized** effects of the remedial measures at the Eastern Plume are measured primarily by observing the cone of depression near each extraction well.*

b. "However, the extraction system shutdown provided an opportunity to observe the shallow and deep aquifers while in equilibrium under non-pumping conditions."

   There is inadequate data to conclude that the cones of depression surrounding the extraction wells completely disappeared, and therefore it is cannot be said that the aquifers recovered to equilibrium conditions. The following four bullets focus on anomalies in the shallow aquifer, which are not representative of the Eastern Plume. The return of artesian head at EW-2A is likely a local phenomenon where strong groundwater confinement is evident. The head in EW-2A may or may not have completely recovered. MEDEP suggests the following language: ***"However, the extraction system shutdown provided an opportunity to observe the shallow and deep aquifers after a prolonged shutdown of the extraction system."*** (ED)

   Response—The Navy agrees that the word "equilibrium" should not, in its strictest sense, be used in this sentence. However, the intent of the sentence is to indicate that while the pumps were down, observations were made on the conditions of the shallow and deep aquifers. The sentence has been re-worded to read:

   > *However, the extraction system shutdown provided an opportunity to observe the shallow and deep aquifers under non-pumping conditions, after a prolonged shutdown of the extraction system.*

11. ***Section 3.2.3, Effects of Remedial Measures – Eastern Plume, Page 3-5, 2nd Bullet***— "With the extraction wells off, a ground-water mound was observed at EW-1 in the shallow interval. This indicates that ground water was likely to be flowing inside the well casing from the deep aquifer into the shallow flow system."

    Although flow within the 78-foot well screen likely did occur, this flow would not have been fast enough to create a shallow groundwater mound of the size shown on Figure 5. The most obvious explanation for this mound is that EW-01 reflects the head in the deep sandy zone, and not the shallow unconfined zone. The groundwater elevation of EW-01 belongs only on Figure 6 (deep potentiometric surface map) - not on Figure 5. Please delete EW-01 from this and future shallow groundwater potentiometric maps. (ED)

    Response—We agree that water elevations at EW-01 are reflective of the deep sand interval rather than the upper sand unit. The water elevations at EW-01 will be removed from future shallow water elevation contour maps.

12. *Section 3.2.3, Effects of Remedial Measures – Eastern Plume, Page 3-5, 3rd Bullet*—"Ground-water data at MW-225B indicate a strong downward flow gradient from the shallow aquifer to the deep aquifer at or near this location. These data are considered to be anomalous (possibly the result of field measurement error or transcription error) and are not considered to be reliable. Flow from the upper sand …"

    a. The Navy acknowledges that the groundwater elevation measured in MW-225B is anomalously low, and attributes this to field error. The water level is over three feet lower than past elevations measured (specifically, Monitoring Event 17, September 2000). In response to MEDEP comment 8.b, of our letter of July 24, 2002, the Navy stated "There is no well in the Weapons Area, or other potential "sink" of ground water." If this is the case, the data recorded at MW-225B are likely due to field measurement error, and these data should have been flagged as unreliable on this map. Due to this field error, the elevation for MW-225B should not have been used for contouring on Figure 5 in Monitoring Event 19, the value should be removed from the map with a notation to explain this action. Figure 5 in Monitoring Event 19 must be redrawn and re-issued to avoid erroneous depiction to shallow groundwater potentiometric surface contours. (ED/RR)

       Response—We agree that these data were collected in error. The revised Figure 5 from Monitoring Event 19 to remove this data point is attached to this response to comment document.

       Comment on Response—Please discuss how the Navy proposes to handle this error in Monitoring Event Report 19.

       Response—The revised Figure 5 from Monitoring Event 19 will have this data point removed, and is attached to this response to comment document.

    b. Also the first sentence of the bullet should be deleted. (ED)

       Response—The first sentence of the 3rd bullet has been deleted.

13. *Section 3.3.2.1, Volatile Organic Compound Concentrations and Distribution, Shallow Monitoring Wells, Page 3-7, 4th Bullet*—"Data from Monitoring Event 19 indicate that trichloroethene and tetrachloroethene were detected above regulatory criteria in the deep diffusion sampler in this well. The two other diffusion samplers, and the low-flow sample collected from this well …"

    a. While MEDEP believes that the well referenced is MW-231B, the Navy should identify the well in this statement. (ED)

       Response—The fourth bullet in this section has been revised per Comment No. 13b.

       Comment on Response—MEDEP would like to know which well is being referenced before concurring with the response to our comment.

       Response—See response to Comment No. 13b.

b. After a thorough examination of groundwater analytical results for Monitoring Events 18 and 19, and preliminary data from Monitoring Event 20, MEDEP believes that the second explanation for the anomalous solvent hits in the lower diffusion sample in MW-231B is feasible. That is, the sample was somehow not tracked properly in the field or laboratory, and does not represent water from MW-231B. A review of the last three event results strongly indicates that the sample reported as MW-231B may be MW-229A. The results from Monitoring Event 19 reported for MW-229A are essentially non-detects, whereas the chem graph for this well in Appendix A-4 of the 2001 Annual Report historically show 1,1,1-TCA and TCE at levels above 30 µg/L, and PCE and 1,2-total DCE between approximately 4 and 10 µg/L. These concentrations are a good match for those reported as MW-231B. Furthermore, it is quite difficult to accept that the solvent plume could rise over 30 feet in elevation as it moves southward from the MW-205/MW-229A area.

Response—The Navy agrees with this comment. These samples are likely to have been switched. The figures noting shallow and deep contaminant concentrations have been revised to correct this error, and are attached to this response to comment document. Additionally, text has been added to the Final Annual Report to note these samples are likely to have been switched. This text, added to Section 3.3.2.1, Volatile Organic Compound Concentrations and Distribution, Shallow Monitoring Wells, Page 3-7, as a revised 4th Bullet, is shown below:

- *Data from Monitoring Event 19 indicate that trichloroethene and tetrachloroethene were detected above regulatory criteria in the deep diffusion sampler in monitoring well MW-231B. The other two diffusion samplers, and the low-flow sample collected from this well during the same monitoring event, did not indicate that these VOCs were present. The detection of VOCs above regulatory standards has not been noted previously at this location. However, it is suspected that samples from MW-231B and MW-229A appear to have been switched during the field sampling program. To identify this error, a note will be placed in the site database so the reader is aware that sample results for these monitoring wells have been switched. This note will also be placed on the trend graphs.*

Given the strong indications that the laboratory results were incorrectly assigned to the sampled well, the results needed to be flagged throughout the report and the text changed appropriately. It also appears likely that the chemical results for MW-229A belong with MW-230A based on their chemical graphs. However, it is not so apparent which well the MW-230A sample represents. MEDEP recommends that Figure 8 and Table A-3 in Monitoring Event 19 and Figure 3-1 in the 2001 Annual Report be corrected and footnotes provided to indicate the re-assignments and any degree of associated uncertainty. Also, the entire fourth bullet (on page 3-7 and 3-8) should be deleted from the report. (ED)

Response—We agree with this comment, and have made the requested changes to the Final Annual Report. Table A-3 has been changed to correctly specify well sample identifications, and the referenced figures have been corrected, and are attached to this comment document. In addition, the fourth bullet on Pages 3.7 and 3.8 has been revised as indicated above.

Comment on Response—As discussed in our regularly scheduled conference call (July 31, 2003) it was agreed to by the stakeholders that the information should be changed to reflect what is believed to the correct well with a footnote to be carried though in all future reports that this information was changed. Also during that call it was agreed that the same information in Monitoring Event 19 must be revised. Please address how the erroneous information will be handled in the Monitoring Event 19 report since it has already been issued.

Response—Based on the June 2003 Technical Meeting, the errors on the figures and tables will be footnoted and attached to this response to comment document.

c. Should laboratory results from future sampling events indicate a sudden presence of plume contaminants at a sentinel well at concentrations greater than the MEGs/MCLs, the Navy needs to immediately discuss this with the stakeholders and, if necessary, resample the well, and not wait until the next scheduled monitoring event. (RR)

Response—The Navy agrees with this comment, and will immediately bring future anomalies (real or otherwise) to the stakeholders' attention. It is important to note that, in general, field errors such as this have been extremely rare, and we will continue to try to maintain this high degree of accuracy.

14. ***Section 3.3.2.1, Volatile Organic Compound Concentrations and Distribution, Shallow Monitoring Wells, Page 3-8, 5th Bullet***—"Although concentrations remain below regulatory criteria, the noted rise in VOC concentrations indicates that the Eastern Plume is migrating in the shallow interval along the leading edge of the plume."

This statement might be somewhat misleading in that it has not been previously established that the plume is moving eastward toward MW-313, although admittedly, the fall 2001 shallow potentiometric contour map suggests that this was happening during the cession of pumping following September 11. The contamination increase at MW-313 may well be the result of migration of the shallow contamination documented at MW-332, caused by MW-311 overflowing its casing in the early 1990s. That subsequent small plume appears not to be directly connected to the main body of the Eastern Plume. Alternatively, under remedial pumping conditions, the eastern side of the deeper Eastern Plume may be diffusing cross-gradient to engulf the MW-313 screen, located just above the top of the clay. Until the leading edge direct-push sampling is completed this summer and the results evaluated, the Navy should not implicate MW-313 as located within the ***direct*** pathway of the Eastern Plume. Therefore, please delete this sentence. (ED)

Response—The statement cited above will be deleted from Page 3-8. The plume pathway in this area will be re-assessed once more data are available.

15. ***Section 3.3.2.1, Volatile Organic Compound Concentrations and Distribution, Deep Monitoring Wells, Page 3-9, Last Three Bullets***—"Samples from six monitoring wells located along the leading edge of the Eastern Plume showed an increase in total VOC concentrations based on data collected ...These results indicated consistent increases in VOC portion of the Eastern Plume. These results indicated consistent increases in VOC concentrations on the leading edge of the plume..."

"Samples from deep monitoring wells MW-NASB-212, MW-229A, and MW-306 (all perimeter wells) show stable or decreasing VOC trends based on data collected ..."

"Ground-water samples collected from shallow and deep sentinels wells MW-231-B, MW-313, MW-318, MW-230A, MW-231A, MW-303, MW-305, MW-333, MW-334, MW-308, MW-309, and P-132) did not detect VOCs above the State MEGs or Federal MCLs."

a. These characterizations of general contaminant concentrations at points other than MW-311 and MW-NASB-212 indicate that the vast majority of monitoring wells have shown no significant trend over the past 2-3 years. The only other well showing a discernable decrease over time is MW-229A. MW-331 and P-106 should be added to the stable category. The steady decline at MW-311 was the subject of an earlier comment (Comment No. 3), whereby MEDEP does not presently regard this well as a reliable indicator of the general progress of contaminant reduction of the Eastern Plume. (ED & RR)

   Response—Comment noted. Each trend graph for the monitoring wells presented within this section of the report was reviewed for overall VOC contaminant trends in these wells. After reviewing the trend graphs, we determined that monitoring well MW-205 VOC contaminant trends over 1-, 2-, and 3-year periods are increasing, decreasing, and decreasing, respectively. All the other monitoring wells display upward trending concentrations; however, except for MW-225A, there are no compounds exceeding the MEG and MCL in wells MW-230, MW-313, MW-333, and MW-334.

   The referenced bullet text will be revised as follows:

   > *Samples from ~~six~~ five monitoring wells located along the leading edge of the Eastern Plume show an increase in total VOC concentrations based on data collected in the past 2-3 years (~~MW-205[deep],~~ MW-225A [deep], MW-230A [deep], MW-313 [shallow], MW-333 [deep], and MW-334 [deep]). The increase in VOC concentrations at MW-313, MW-333, and MW-334 is of particular interest as these wells are located in the southeast portion of the Eastern Plume. These results indicate consistent increases in VOC concentrations of the leading edge of the plume, although concentrations remain below State MEGs and Federal MCLs. It is likely that concentrations have been increasing due to movement of VOC-impacted groundwater toward Mere Brook.*

   The second referenced bullet text will be revised as follows:

   > *Samples from deep monitoring wells MW-NASB-212, MW-229A, MW-306 (all perimeter wells) and from wells MW-311 and P-106 (both interior plume wells) show stable or decreasing VOC trends based on the data collected during the Long-Term Monitoring Program.*

   The Navy believes that groundwater monitoring well MW-311 is a reliable indicator of the general progress of contaminant reduction of the Eastern Plume. MEDEP's comment No. 3 relates to the water elevations and the Navy's use of a subjective term "slightly" to quantify the observed change in groundwater elevations. The Navy is unclear as to the reason for the MEDEP's statement that this monitoring well is "not a reliable indicator" for monitoring contaminant within the Eastern Plume. We suggest that we make this an agenda item to be discussed at the October 2003 Technical Meeting.

b. MW 231B could be added to the last bullet since Table A-3 and Figure 3-1 are to be corrected as discussed above. (ED)

   Response—Comment noted. However, MW-231B is already cited in the last bullet text of the draft report on Page 3-9 of 3-15.

16. ***Section 3.3.2.1, Volatile Organic Compound Concentrations and Distribution, Deep Monitoring Wells, Page 3-9, 1st Complete Bullet***—"Trend data collected between 1995 and 2001 indicated total VOC concentrations have continued to decrease at monitoring points MW-311 and MW-NASB-212. These declining VOC concentration are likely the result of natural ground-water flow and natural attenuation,...."

    One attenuation mechanism that the MEDEP believes is partially to largely responsible for the orders-of-magnitude decline in measured VOCs in well MW-311 is dilution from relatively uncontaminated groundwater captured by the EW-02A drawdown cone. A general long-term temperature increase in water pumped by EW-02A could indicate that warm summer surface (or near surface) water has been induced into the deeper screened sand layer. Dilution should be added to the second sentence. (ED)

    Response—"Dilution" will be added to the referenced sentence.

17. ***Section 3.6, Conclusions and Recommendations, Pages 3-13 through 3-15***—MEDEP agrees with the conclusions and recommendations in this section except as noted. (NR)

    Response—No response required.

18. ***Section 3.6.1, Ground-Water Sampling Program, Page 3-13, 2nd Conclusion and Recommendation***—

    a. "The migration of the main body of the Eastern Plume appears to be slowing."

       The Navy needs to provide the basis for this statement since there has been virtually no reported documentation of plume migration rates in terms of distance per year. The rate of plume movement southward likely has been variable depending on volume of extraction pumpage and rates of individual wells on line. (RR)

       Response—The Navy agrees with this comment, and this statement has been removed from the report. The statement was intended to note that the overall downgradient movement of the Eastern Plume does not appear to be significant over time, and that existing data do not show increasing concentrations of contaminants in downgradient wells over time.

b. Begin discussions with the project Technical Evaluation Group and regulators for optimization of the Eastern Plume sampling network to determine which sampling points may be candidates for yearly sampling (as opposed to the current twice per year sampling), or which points are determined to be redundant and can be eliminated from the program. In addition, these discussion could also be used to assess if other monitoring points are needed to track movements of the hotspots areas within the Eastern Plume.

MEDEP looks forward to discussing this with the Navy, however, at this time, MEDEP does not believe that there is an excess of wells being monitored at the Eastern Plume, although through optimization, perhaps several new monitoring wells could replace a few existing wells. (RR)

Response—The Navy believes this comment is best addressed during technical meetings rather than in a written format. During technical meetings held in 2003, the Navy distributed natural attenuation protocols and has been initiating discussions with site stakeholders regarding the applicability of natural attention at this site. These discussions are expected to continue, and will involve site stakeholders in the decision-making process.

19. ***Section 3.6.2, Extraction System, Page 3-14, 1st Conclusion and Recommendation***—MEDEP agrees with the stated conclusion, and the recommendation that collection of natural attenuation parameters should be initiated soon. However, before setting a time for abandoning the groundwater extraction system, a thorough analysis of concentrations versus time and pumpage history (volumes and locations) needs to be performed, and a consensus reached among stakeholders that optimization of VOC removal has been achieved and the point of diminishing returns has been reached. (RR)

Response—The Navy agrees with this comment, and looks forward to discussing it with site stakeholders in future technical meetings. We anticipate discussions regarding the overall effectiveness of the remedial system during the December 2003 technical meetings.

20. ***Section 3.6.2, Extraction System, p.3-14, 2nd Conclusion and Recommendation***:

a. "...However, influent total VOC concentrations have been stable at approximately 50 μg/L since 1998."

MEDEP cannot relate these figures to EW-02A; please provide the context of and basis for this statement. (RR)

Response—The sentence will be deleted from this section.

b. "Following the 3-month long plant shutdown between September and November 2001, VOC influent concentrations did not increase (i.e., no rebound effect was observed following the cessation of ground-water extraction). The trend graphs for this well and for MW-311 suggests that a significant mass of VOCs is no longer present in this portion of the Eastern Plume."

MEDEP will take this under consideration once the Monitoring Event 20 data are received. (NR)

Response—No response required.

c. "EW-2A should be considered for decommissioning and/or conversion into a monitoring point with potential future use as an extraction well, if needed."

EW-02A should not be decommissioned anytime soon. (NR)

Response—The Navy agrees with this comment.

21. ***Section 3.6.2, Extraction System, p.3-15, 3rd Conclusion and Recommendation***—
"EA recommends abandonment of extraction well EW-01 …"

MEDEP agrees with this conclusion, but cannot agree with the recommendation to decommission this well unless a suitable replacement well is installed and put into operation. EW-01 is pumping at a rate of 8 gal/min (Monthly Operations Report for 1-30 November 2002-Ground-Water Extraction and Treatment System), and is the only remedial well near the southern leading edge of the Eastern Plume. Unfortunately, the radius of drawdown is relatively small and would not be expected to exert much hydraulic control over plume movement. However, its pumpage may be important as it is removing approximately 100 µg/L of VOC, including TCE at nearly one order-of-magnitude higher than its MCL/MEG of 5 µg/L. The Navy's suggested action needs to be discussed at the next regular scheduled conference call or meeting. (MTG)

Response—The Navy agrees that any plans to abandon EW-01 would need to be discussed with site stakeholders. We would anticipate discussions regarding the overall effectiveness of the remedial system during the December 2003 technical meetings.

22. ***Figure 3-1***—Providing that errors are not present (see earlier comment 13.b), this map portrayal of contaminant distribution is very valuable to the reviewer. Please continue to include this type of figure in each future Eastern Plume report. Can a way be found to show the full pie diagram for EW-02A? (ED)

Response—The site data are distributed with each annual GIS version. MEDEP is free to use these data for in-depth analysis that is not included in the Navy version of the Annual Report.

Comment on Response—It is not clear if a Figure 3-1 will be included in future monitoring event reports, as requested above. The annual reports are to be eliminated after the 2001 versions and the monitoring event reports are to replace them as a convenience and cost savings to the Navy, however, it was MEDEP's understanding that similar information in the annual reports is still to be provided in the monitoring event reports. If this is not the case, then MEDEP will need to reconsider its concurrence with the elimination of annual reports.

Response—A graphical representation of the distribution of VOCs will be included in future monitoring event reports.

23. ***Appendix A-4, Long-Term Monitoring Trend Results***—Graphs for two wells (MW-229A and MW-NASB-212) show one date where the total VOC value is less than the sum of the constituent values. Please correct these graphs. (ED)

    Response—This is due to the way total VOCs are calculated (i.e., ignoring methylene chloride and acetone). The graphs will be revised to note that common laboratory contaminants are not included and, therefore, total VOC numbers do not include these compounds.

24. ***Appendix B-3, Navy's Response of MEDEP Comment 9, 24 July 2002***—Upon re-examination, MEDEP stands by its original statement that the water level measurement for MW-231A is incorrect in Table 4, and that when corrected, a value of 23.66 feet above sea level will result. The value of 23.66 feet needs to replace 20.70 feet on Figure 6 in the Monitoring Event 19 Report, and contours redrawn. (ED)

    Response—The field data sheet for MW-231A from Monitoring Event No. 19 was checked and the correct groundwater elevation is 23.66 ft MSL. The groundwater contour map (Figure 6) is attached.

    Comment on Response—A revised Figure 6 was not received by MEDEP.

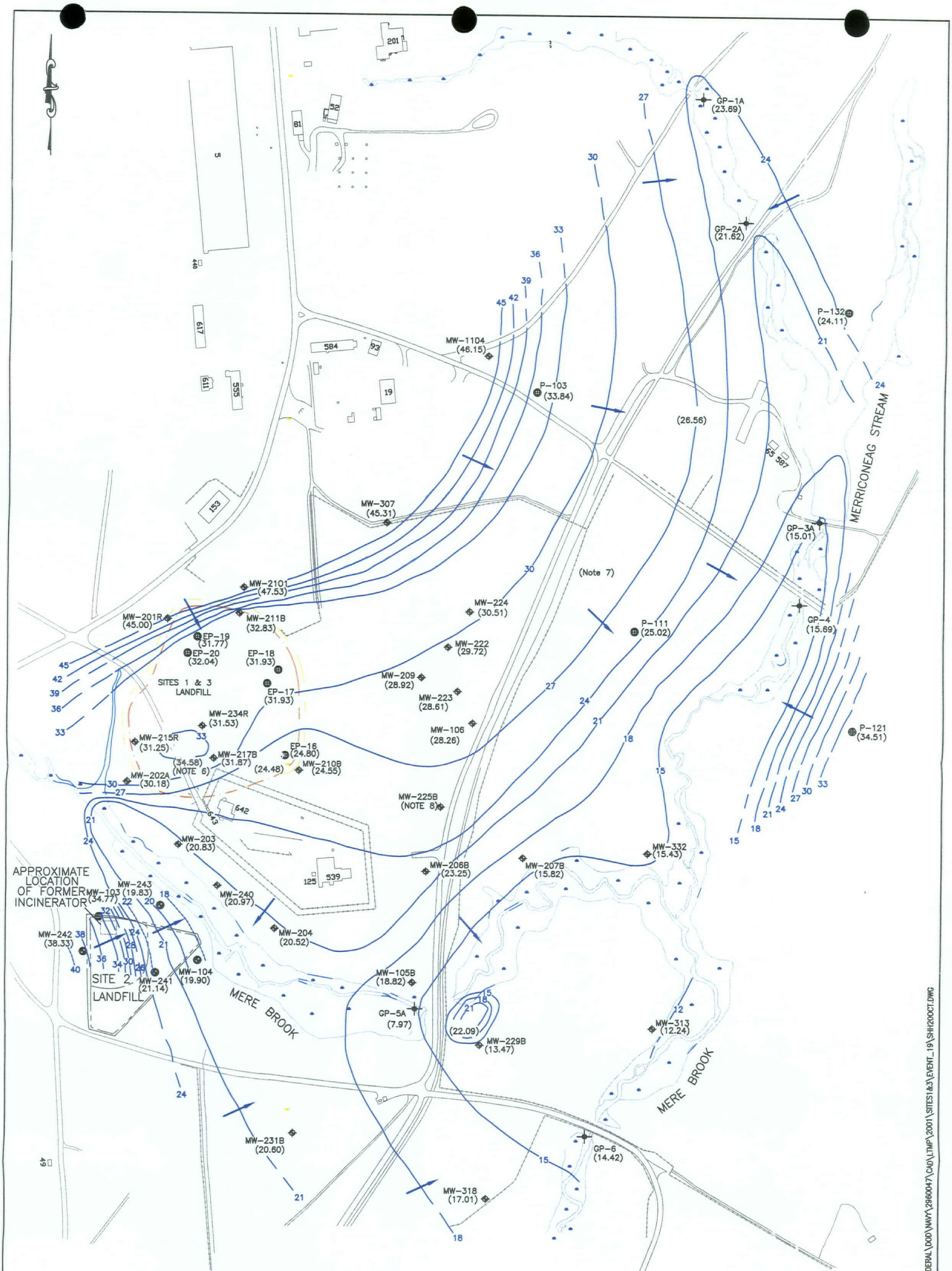
    Response—EA forwarded Figure 6 to MEDEP on 18 July and 1 August 2003 along with the response to comments on the 2001 Draft Annual Report. A revised Figure 6 is attached to this response to comment document.

25. ***Appendix B-3, Navy's Response of MEDEP Comment 10, 24 July 2002***—The Navy's response says that the revised and updated Table 5 would be included in the 2001 Annual Report. MEDEP could not find this revised and updated Table. Please correct. (ED)

    Response—EA forwarded revised Table 5 to MEDEP on 18 July 2003 along with the response to comments on the Draft 2001 Annual Report. The revised Table 5 is attached to this response to comment document.

Attachment

Revised Figures and Tables



LEGEND

- MW-231B (20.60) SHALLOW MONITORING WELL (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- (22.09) EXTRACTION WELL (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- EP-16 (24.80) SHALLOW PIEZOMETER (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- GP-6 (14.42) SHALLOW PIEZOMETER (SURFACE WATER ELEVATION, FT MSL)
- FENCE
- APPROXIMATE LIMITS OF SLURRY WALL
- APPROXIMATE LIMITS OF SITES 1 & 3
- —27— GROUND-WATER CONTOUR (FT MSL) (DASHED WHERE INFERRED)
- INFERRED GROUND-WATER FLOW DIRECTION

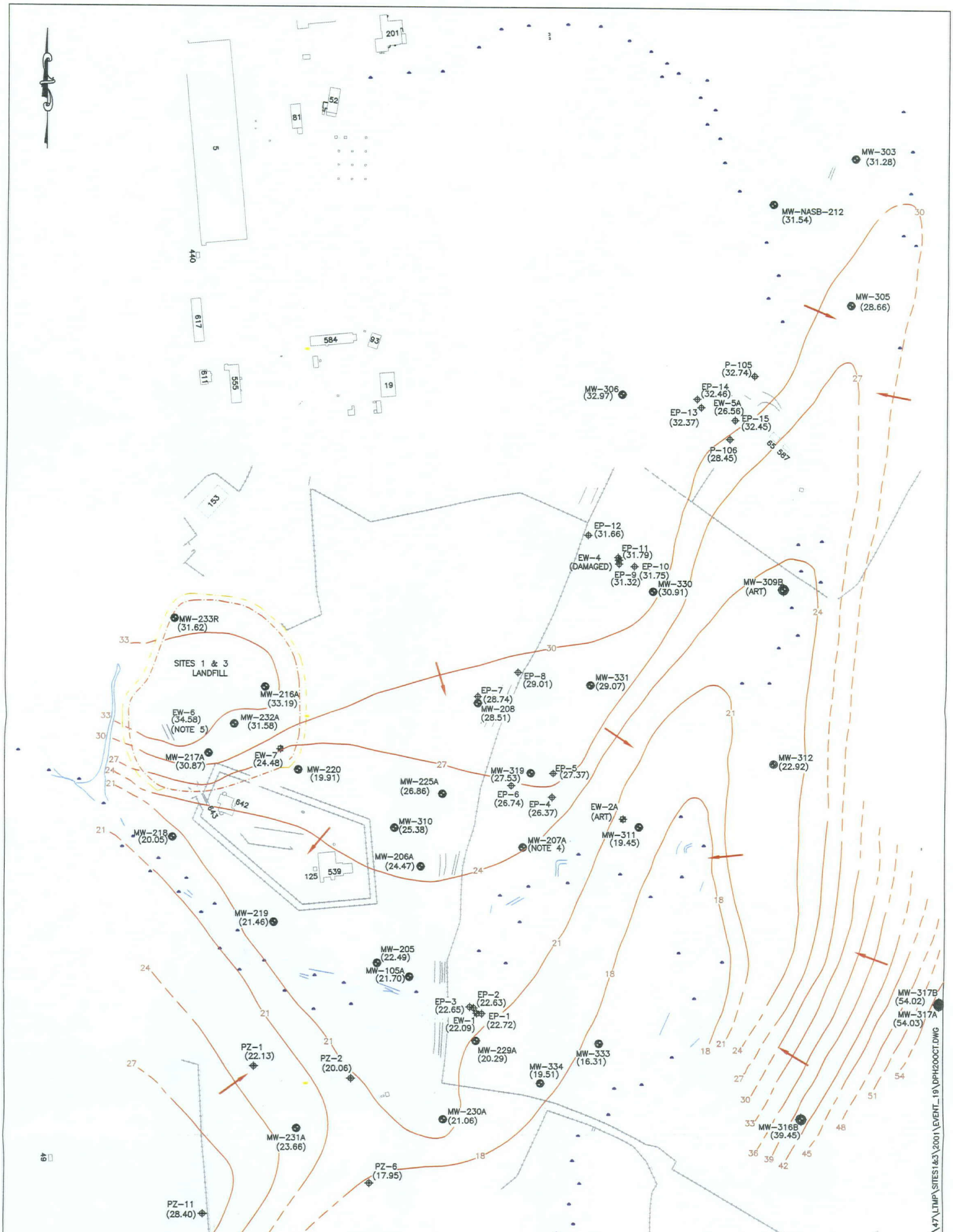
NOTE:

1. WATER LEVEL DATA COLLECTED 29 – 30 OCTOBER 2001. 0.02 IN. OF PRECIPITATION (RAIN) WAS NOTED 1 WEEK BEFORE AND DURING GAUGING PERIOD.
2. EXTRACTION WELLS EW-1, EW-2A, EW-4 AND EW-5A WERE NOT IN OPERATION DURING WELL GAUGING ACTIVITY.
3. CONTOUR INTERVAL = 3 FT.
4. SITE PLAN TAKEN FROM THE INTERGRAPH VERSION 5 BASE-WIDE PLAN PROVIDED BY NAS BRUNSWICK PUBLIC WORKS DEPARTMENT ON 13 OCTOBER 1995.
5. CONTOURS REPRESENT EVALUATION OF PROBABLE CONDITIONS BASED ON PRESENTLY AVAILABLE DATA. SOME VARIATION FROM THESE CONDITIONS MUST BE EXPECTED.
6. WATER IN VAULT. UNABLE TO CHECK STATUS OF BOTTOM OF VAULT. PREVIOUSLY REPORTED THAT THE VAULT APPEARED TO BE SINKING.
7. WELL NOT GAUGED DUE TO LOOSE WIRES IN WELL.
8. NO DATA. MEASURED GROUNDWATER ELEVATION IS ANOMALOUSLY LOW, AND WAS LIKELY COLLECTED IN ERROR.

FIGURE 5
INTERPRETED SHALLOW GROUND-WATER POTENTIOMETRIC SURFACE CONTOUR MAP, 29 – 30 OCTOBER 2001

SITES 1 AND 3 AND EASTERN PLUME
NAVAL AIR STATION, BRUNSWICK, MAINE

DATE 28 OCTOBER 2003	PROJECT NUMBER 29600.47
DESIGNED BY ACE	SCALE 1"=400'
DRAWN BY SAP	FILE NAME SHH20OCT.DWG
CHECKED BY GMC	DRAWING NUMBER –
PROJECT MANAGER ACE	SHEET NUMBER –



LEGEND

- MW-317B (54.02) BEDROCK MONITORING WELL (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- MW-231A (20.70) DEEP MONITORING WELL (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- EW-1 (22.09) EXTRACTION WELL (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- EP-11 (31.79) DEEP PIEZOMETER (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- PZ-11 (28.40) NEW PIEZOMETERS INSTALLED 29 JUNE 2001 (POTENTIOMETRIC SURFACE ELEVATION, FT MSL)
- FENCE
- APPROXIMATE LIMITS OF SLURRY WALL
- APPROXIMATE LIMITS OF SITES 1 & 3
- 27 GROUND-WATER CONTOUR (FT MSL) (DASHED WHERE INFERRED)
- INFERRED GROUND-WATER FLOW DIRECTION

NOTES:

1. WATER LEVEL DATA COLLECTED 29-30 OCTOBER 2001. 0.02 IN. OF PRECIPITATION (RAIN) WAS NOTED 1 WEEK BEFORE AND DURING GAUGING PERIOD.
2. EXTRACTION WELLS EW-1, EW-2A, EW-4, AND EW-5A WERE NOT IN OPERATION DURING WELL GAUGING EVENT.
3. CONTOUR INTERVAL = 3 FT.
4. WELL REPLACED, NO SURVEY DATA PRESENTLY AVAILABLE.
5. WATER IN VAULT. UNABLE TO CHECK STATUS OF BOTTOM OF VAULT PREVIOUSLY REPORTED THAT THE VAULT APPEARED TO BE SINKING.
6. SITE PLAN TAKEN FROM THE INTERGRAPH VERSION 5 BASE-WIDE PLAN PROVIDED BY NAS BRUNSWICK PUBLIC WORKS DEPARTMENT ON 13 OCTOBER 1995.
7. CONTOURS REPRESENT EVALUATION OF PROBABLE CONDITIONS BASED ON PRESENTLY AVAILABLE DATA. SOME VARIATION FROM THESE CONDITIONS MUST BE EXPECTED.
8. ART = ARTESIAN

0 100 200 400
GRAPHIC SCALE IN FEET

FILE: F:\CAD\29600\47\LTMP\SITES1&3\2001\EVENT_19\DPH20OCT.DWG

SITES 1 AND 3 AND EASTERN PLUME

NAVAL AIR STATION, BRUNSWICK, MAINE

FIGURE 6

INTERPRETED DEEP GROUND-WATER POTENTIOMETRIC SURFACE CONTOUR MAP, 29 – 30 OCTOBER 2001

DATE	3 APRIL 2002
DESIGNED BY	ACE
DRAWN BY	SAP
CHECKED BY	GMC
PROJECT MANAGER	ACE

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

THE MAPLE BUILDING
3 WASHINGTON CENTER
NEWBURGH, NY 12550
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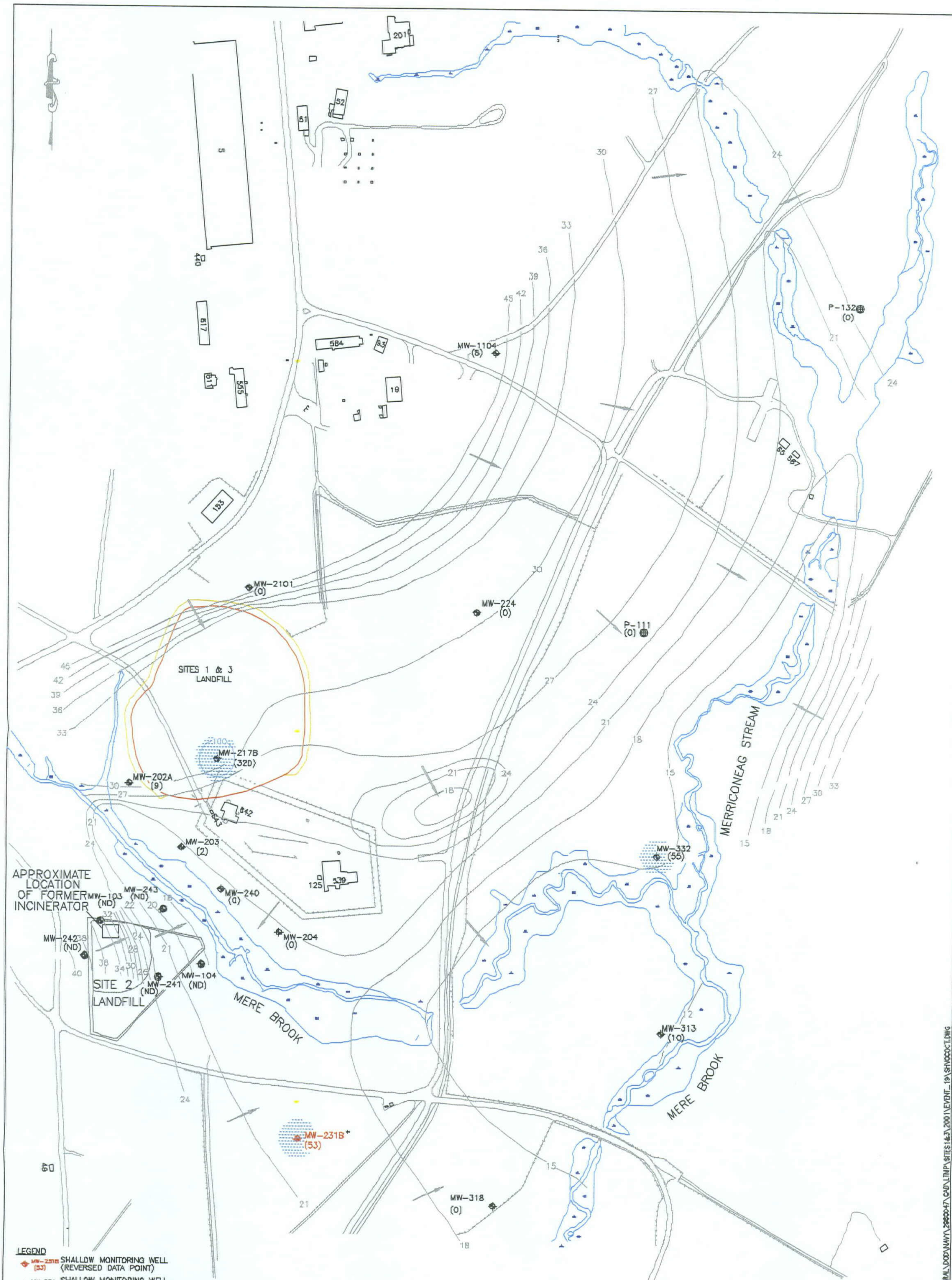
PROJECT NUMBER	29600.47
SCALE	1"=400'
FILE NAME	DPH20OCT.DWG
DRAWING NUMBER	–
SHEET NUMBER	–



LEGEND

- MW-231B (53) SHALLOW MONITORING WELL (REVERSED DATA POINT)
- MW-224 (0) SHALLOW MONITORING WELL (TOTAL VOC CONCENTRATION)
- P-132 (0) SHALLOW PIEZOMETER (TOTAL VOC CONCENTRATION, ND = NOT DETECTED)
- INFERRED AREA ABOVE STATE MEG/FEDERAL MCL CONCENTRATION
- 100 100 ug/L TOTAL VOC CONTOUR (DASHED WHERE INFERRED)
- FENCE
- APPROXIMATE LIMITS OF SLURRY WALL
- APPROXIMATE LIMITS OF SITES 1 & 3
- 27 GROUND-WATER CONTOUR (FT MSL) FOR 29 – 30 OCTOBER 2001 FROM FIGURE 5 (DASHED WHERE INFERRED)
- INFERRED GROUND-WATER FLOW DIRECTION

NOTE:

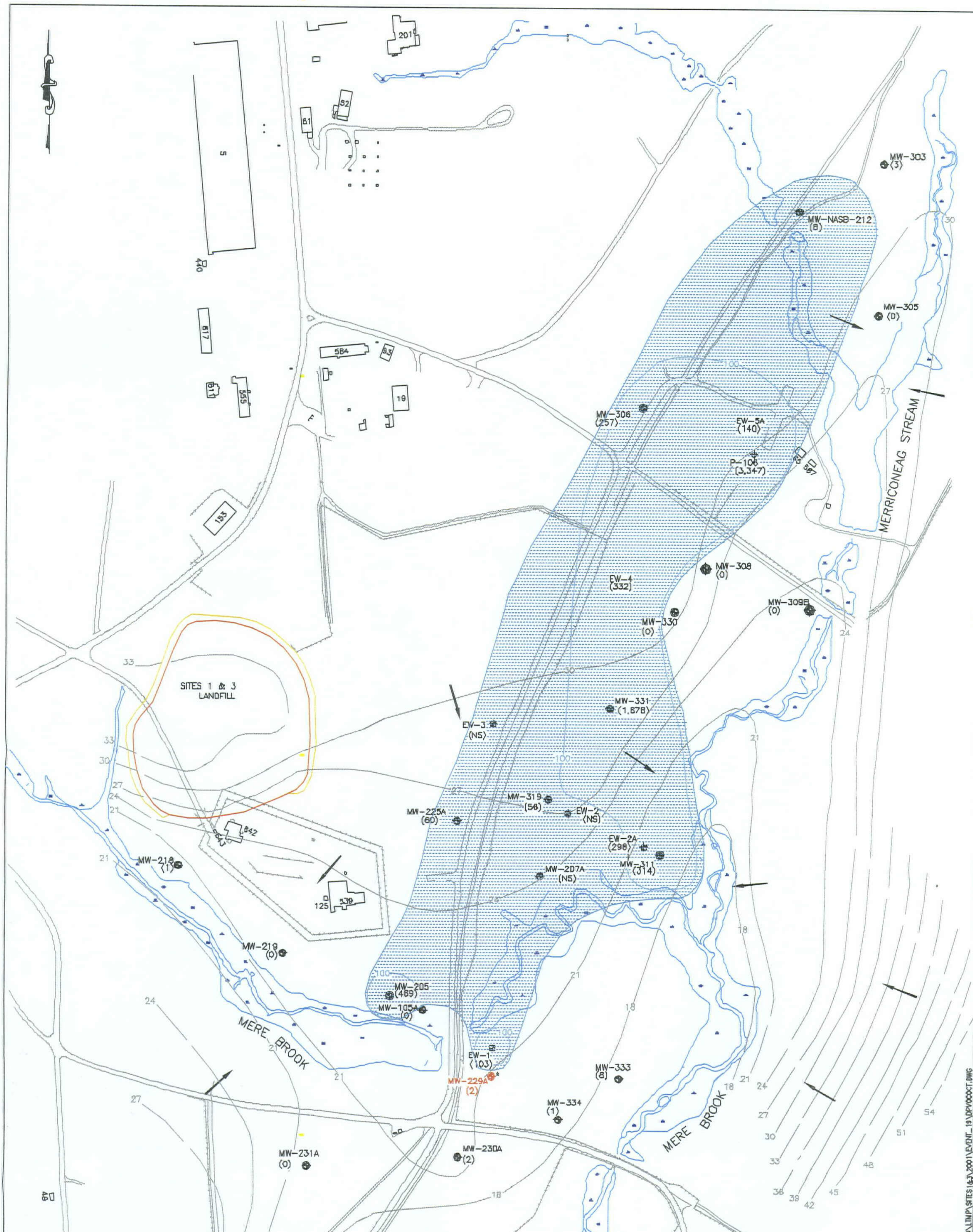
1. SITE PLAN TAKEN FROM THE INTERGRAPH VERSION 5 BASE-WIDE PLAN PROVIDED BY NAS BRUNSWICK PUBLIC WORKS DEPARTMENT ON 13 OCTOBER 1995.
2. CONTOURS REPRESENT EVALUATION OF PROBABLE CONDITIONS BASED ON PRESENTLY AVAILABLE DATA. SOME VARIATION FROM THESE CONDITIONS MUST BE EXPECTED.
3. SITE 2, TOTAL VOC CONCENTRATIONS ARE PROVIDED IN THE MONITORING EVENT 4 REPORT FOR SITE 2, OCTOBER 2001 (SEE TABLE A-1)
4. *THE ANALYTICAL DATA REPORTED FROM MW-231B AND MW-228A (FIG. 8) HAVE BEEN REVERSED FOR THESE WELLS FOR THE FALL 2001 LTMP (ME 19 REPORT).

FIGURE 8
INTERPRETED TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATION CONTOUR MAP
SHALLOW WELLS, MONITORING EVENT 19

SITES 1 AND 3 AND EASTERN PLUME

NAVAL AIR STATION, BRUNSWICK, MAINE

DATE 28 OCTOBER 2003		PROJECT NUMBER 29600.47
DESIGNED BY SAP		SCALE 1"=400'
DRAWN BY SAP		FILE NAME SHVOCOCT.DWG
CHECKED BY CNC		DRAWING NUMBER –
PROJECT MANAGER ACE		SHEET NUMBER –



LEGEND

- MW-231A (0) DEEP MONITORING WELL (REVERSED DATA POINTS)
- MW-308B (0) BEDROCK MONITORING WELL (TOTAL VOC CONCENTRATION)
- MW-231A (0) DEEP MONITORING WELL (TOTAL VOC CONCENTRATION)
- (288) EXTRACTION WELL (TOTAL VOC CONCENTRATION)
- P-106 (3,347) DEEP PIEZOMETER (TOTAL VOC CONCENTRATION)
- FENCE
- APPROXIMATE LIMITS OF SLURRY WALL
- APPROXIMATE LIMITS OF SITES 1 & 3
- INFERRED AREA ABOVE STATE MEG/FEDERAL MCL CONCENTRATION
- 100 100 ug/L TOTAL VOC CONTOUR (DASHED WHERE INFERRED)
- NS NOT SAMPLED
- —27— GROUND-WATER CONTOUR (FT MSL) FOR 29 30 OCTOBER 2001FROM FIGURE 6 (DASHED WHERE INFERRED)
- INFERRED GROUND-WATER FLOW DIRECTION

NOTE:

1. SITE PLAN TAKEN FROM THE INTERGRAPH VERSION 5 BASE-WIDE PLAN PROVIDED BY NAS BRUNSWICK PUBLIC WORKS DEPARTMENT ON 13 OCTOBER 1995.
2. CONTOURS REPRESENT EVALUATION OF PROBABLE CONDITIONS BASED ON PRESENTLY AVAILABLE DATA. SOME VARIATION FROM THESE CONDITIONS MUST BE EXPECTED.
3. HIGHEST VALUE SHOWN AT DUPLICATE SAMPLE LOCATIONS.
4. *THE ANALYTICAL DATA REPORTED FOR MW-231B AND MW-229A HAVE BEEN REVERSED FOR THESE WELLS IN THE ME 19 REPORT.

FIGURE 9
INTERPRETED TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATION CONTOUR MAP
DEEP WELLS, MONITORING EVENT 19

SITES 1 AND 3 AND EASTERN PLUME
NAVAL AIR STATION, BRUNSWICK, MAINE

DATE 28 OCTOBER 2003	PROJECT NUMBER 29600.47
DESIGNED BY SAP	SCALE 1"=400'
DRAWN BY SAP	FILE NAME dpvoccet.DWG
CHECKED BY GMC	DRAWING NUMBER –
PROJECT MANAGER ACE	SHEET NUMBER –

F:\FEDERAL\DOD\NAVY\29600.47\CAD\TMP\SITES1&3\2001\EVENT_19\DPVOCCET.DWG

TABLE A-3 SUMMARY OF GROUND-WATER SAMPLES COLLECTED FROM THE EASTERN PLUME BETWEEN 30 OCTOBER AND 6 NOVEMBER 2001

VOLATILE ORGANIC COMPOUNDS BY U.S. ENVIRONMENTAL PROTECTION AGENCY METHOD 8260B

			MW-105A	MW-1104				MW-205	MW-224
			Deep Diffusion Sample	Low-flow sample	Shallow Diffusion Sample	Mid-depth Diffusion Sample	Deep Diffusion Sample	Deep Diffusion Sample	Mid-depth Diffusion Sample
Compound/Element	MEG (a)	MCL (b)							
Total VOC	---	---	ND	8	7	7.6	ND	468.8	ND
1,1,1-Trichloroethane	200	200	(<1U)	6	5	5	(<1U)	**230D**	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	(<1U)	2	2	2	(<1U)	0.8J	(<1U)
1,1-Dichloroethene	7	7	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	**20**	(<1U)
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	19	(<1U)
Acetone	---	---	(<5U)	(<5U)	6	6	6	(<5U)	(<5U)
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	0.8JB	(<1U)
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	**19**	(<1U)
Trichloroethene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	**180**	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	0.6J	(<1U)	(<1U)	(<1U)

			MW-225A				MW-225A (Dup)			
			Low-flow sample	Shallow Diffusion Sample	Mid-depth Diffusion Sample	Deep Diffusion Sample	Low-flow sample	Shallow Diffusion Sample	Mid-depth Diffusion Sample	Deep Diffusion Sample
Compound/Element	MEG (a)	MCL (b)								
Total VOC	---	---	41.8	31.5	60	57	42.6	56	55.5	55.9
1,1,1-Trichloroethane	200	200	5	4	8	8	6	7	7	8
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	0.5J	(<1U)
1,1-Dichloroethene	7	7	0.8J	0.5J	1	1	0.6J	1	1	0.9J
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	20	14	27	26	20	26	26	26
Acetone	---	---	(<5U)	3J	3J	3J	(<5U)	(<5U)	(<5U)	4JB
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Tetrachloroethene	3	5	2	2	**4**	3	2	3	3	3
Trichloroethene	5	5	**14**	**11**	**20**	**19**	**14**	**19**	**18**	**18**
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

TABLE A-3 (CONTINUED) Revised October 2003

			MW-229A*	MW-230A				MW-231A			
			Mid-depth Diffusion Sample	Low-flow sample	Shallow Diffusion Sample	Mid-depth Diffusion Sample	Deep Diffusion Sample	Low-flow sample	Shallow Diffusion Sample	Mid-depth Diffusion Sample	Deep Diffusion Sample
Compound/Element	MEG (a)	MCL (b)									
Total VOC	---	---	1.6	1.9	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	200	200	1	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethene	7	7	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethane	5	5	(<1U)	0.9J	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	0.6J	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Acetone	---	---	7	(<5U)	4JB	(<5U)	(<5U)	(<5U)	(<5U)	4JB	5B
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Trichloroethene	5	5	(<1U)	1	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

			MW-231B*				MW-303			
			Low-flow sample	Shallow Diffusion Sample	Mid-depth Diffusion Sample	Deep Diffusion Sample*	Low-flow sample	Shallow Diffusion Sample	Mid-depth Diffusion Sample	Deep Diffusion Sample
Compound/Element	MEG (a)	MCL (b)								
Total VOC	---	---	ND	ND	ND	53	ND	3	ND	ND
1,1,1-Trichloroethane	200	200	(<1U)	(<1U)	(<1U)	18	(<1U)	(<1U)	(<1U)	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethene	7	7	(<1U)	(<1U)	(<1U)	1	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	(<1U)	(<1U)	(<1U)	7	(<1U)	(<1U)	(<1U)	(<1U)
Acetone	---	---	3J	8	(<5U)	(<5U)	(<5U)	16	4J	(<5U)
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	1J	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	1B	(<1U)	(<1U)
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	6	(<1U)	(<1U)	(<1U)	(<1U)
Trichloroethene	5	5	(<1U)	(<1U)	(<1U)	21	(<1U)	(<1U)	(<1U)	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	2	(<1U)	(<1U)

*Note: As per the 4 February 2003 MEDEP comments, it is believed that the reported analytical data for MW-229A, mid-depth diffusion sample and MW-231B, deep diffusion sample, should be switched.

TABLE A-3 (CONTINUED)

Compound/Element	MEG (a)	MCL (b)	MW-305 Low-flow sample	MW-305 Shallow Diffusion Sample	MW-305 Mid-depth Diffusion Sample	MW-305 Deep Diffusion Sample	MW-306 Deep Diffusion Sample	MW-308 Shallow Diffusion Sample	MW-308 Mid-depth Diffusion Sample	MW-308 Deep Diffusion Sample
Total VOC	---	---	ND	ND	ND	ND	257	ND	ND	ND
1,1,1-Trichloroethane	200	200	(<1U)	(<1U)	(<1U)	(<1U)	120	(<1U)	(<1U)	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	(<1U)	(<1U)	(<1U)	(<1U)	13	(<1U)	(<1U)	(<1U)
1,1-Dichloroethene	7	7	(<1U)	(<1U)	(<1U)	(<1U)	7	(<1U)	(<1U)	(<1U)
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	(<1U)	(<1U)	(<1U)	(<1U)	51	(<1U)	(<1U)	(<1U)
Acetone	---	---	(<5U)	4J	7	(<5U)	(<5U)	8B	6B	7
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	6	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	0.6JB	1B	4B	0.6JB	0.5JB
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Trichloroethene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	**60**	(<1U)	(<1U)	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

Compound/Element	MEG (a)	MCL (b)	MW-308 Low-flow sample	MW-308 (Dup) Low-flow sample	MW-309B Low-flow sample	MW-309B Mid-depth Diffusion Sample	MW-311 Deep Diffusion Sample	MW-311 (Dup) Deep Diffusion Sample	MW-313 Mid-depth Diffusion Sample	MW-313 Deep Diffusion Sample
Total VOC	---	---	ND	ND	ND	ND	314	298	6	6
1,1,1-Trichloroethane	200	200	(<1U)	(<1U)	(<1U)	(<1U)	170	160	(<1U)	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	(<1U)	(<1U)	(<1U)	(<1U)	13	12	4	4
1,1-Dichloroethene	7	7	(<1U)	(<1U)	(<1U)	(<1U)	**34**	**33**	2	2
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	1	1	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	(<1U)	(<1U)	(<1U)	(<1U)	9	10	(<1U)	(<1U)
Acetone	---	---	(<5U)	(<5U)	(<5U)	(<5U)	3J	(<5U)	(<5U)	3J
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	(<1U)	**18**	**18**	(<1U)	(<1U)
Trichloroethene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	**69**	**64**	(<1U)	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

TABLE A-3 (CONTINUED)

Compound/Element	MEG (a)	MCL (b)	MW-313 Low-flow sample	MW-313 Shallow Diffusion Sample	MW-318 Low-flow sample	MW-318 Shallow Diffusion Sample	MW-318 Mid-depth Diffusion Sample	MW-318 Deep Diffusion Sample	MW-319 Deep Diffusion Sample	MW-330 Deep Diffusion Sample
Total VOC	---	---	10	ND	ND	ND	ND	ND	55.7	ND
1,1,1-Trichloroethane	200	200	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	0.7J	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	6	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethene	7	7	4	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	4	(<1U)
Acetone	---	---	(<5U)	4J	(<5U)	3JB	(<5U)	6B	(<5U)	6
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	0.8JB	0.7JB	(<1U)
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	**41**	(<1U)
Trichloroethene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	**10**	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

Compound/Element	MEG (a)	MCL (b)	MW-330 Low-flow sample	MW-330 Shallow Diffusion Sample	MW-330 Mid-depth Diffusion Sample	MW-331 Mid-depth Diffusion Sample	MW-331 (Dup) Mid-depth Diffusion Sample	MW-332 Mid-depth Diffusion Sample	MW-332 (Dup) Mid-depth Diffusion Sample	MW-333 Deep Diffusion Sample
Total VOC	---	---	ND	ND	ND	1,336	1,678	55	46	4
1,1,1-Trichloroethane	200	200	(<1U)	(<1U)	(<1U)	**750D**	**1,000D**	32	26	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	(<1U)	(<1U)	(<1U)	34	34	2	2	3
1,1-Dichloroethene	7	7	(<1U)	(<1U)	(<1U)	**42**	**44**	4	3	1
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	(<1U)	(<1U)	(<1U)	**180**	**180**	2	2	(<1U)
Acetone	---	---	3J	8	4J	3J	4J	(<5U)	5JB	3J
Benzene	5	5	(<1U)	(<1U)	(<1U)	0.8JB	0.6JB	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	0.8JB	0.8JB	(<1U)	0.9JB	(<1U)
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	**16B**	**16B**	1	1	(<1U)
Trichloroethene	5	5	(<1U)	(<1U)	(<1U)	**330D**	**420D**	**14**	**12**	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

TABLE A-3 (CONTINUED)

Compound/Element	MEG (a)	MCL (b)	MW-333 Low-flow sample	MW-333 Shallow Diffusion Sample	MW-333 Mid-depth Diffusion Sample	MW-334 Low-flow sample	MW-334 Shallow Diffusion Sample	MW-334 Mid-depth Diffusion Sample	MW-334 Deep Diffusion Sample	MW-NASB-212 Shallow Diffusion Sample
Total VOC	---	---	8	1	4	1	ND	0.7	ND	7.7
1,1,1-Trichloroethane	200	200	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1,2-Trichloroethane	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	5	1	3	1	(<1U)	0.7J	(<1U)	(<1U)
1,1-Dichloroethene	7	7	3	(<1U)	1	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	0.7J
Acetone	---	---	(<5U)	(<5U)	4J	(<5U)	3J	8	(<5U)	(<5U)
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	0.9JB	(<1U)	1B	(<1U)	0.6JB
Tetrachloroethene	3	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Trichloroethene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	**7**
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

Compound/Element	MEG (a)	MCL (b)	P-106 Low-flow sample	P-111 Low-flow sample	P-132 Low-flow sample	P-132 Shallow Diffusion Sample	P-132 Mid-depth Diffusion Sample	P-132 Deep Diffusion Sample
Total VOC	---	---	3,347	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	200	200	**2,100D**	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1,2-Trichloroethane	3	5	1	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethane	70	---	51	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,1-Dichloroethene	7	7	**280D**	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethane	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
1,2-Dichloroethene, total	70	70	21	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Acetone	---	---	(<5U)	(<5U)	(<5U)	7	4J	7
Benzene	5	5	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloroform	---	100	1J	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Chloromethane	---	---	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)
Methylene chloride	---	5	(<1U)	(<1U)	(<1U)	0.6JB	0.5JB	(<1U)
Tetrachloroethene	3	5	**13**	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Trichloroethene	5	5	**880D**	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)
Xylenes, total	600	10,000	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)	(<1U)

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TABLE A-3 (CONTINUED)

(a) MEG (Maximum Exposure Guideline) obtained from State of Maine Department of Human Services Maximum Exposure Guidelines, memorandum dated 23 October 1992. Dashes (---) indicate compound has no applicable MEG.
(b) MCL (Maximum Contaminant Level) obtained from 40 CFR Parts 141 and 142 (U.S. EPA 1998). Dashes (---) indicate compound has no applicable MCL.

NOTE:
Units are micrograms per liter (µg/L).
Total VOC calculation does not include common laboratory contaminants (Acetone or Methylene Chloride) or VOCs detected in the Field Blank.
U = Not detected. Sample quantitation limits are shown as (<____U).
D = Concentration from a secondary dilution.
J = Estimated concentration.
B = Compound detected in associated method blank.
Only those analytes detected in at least one of the samples, and chemicals of concern listed in the Final Long-Term Monitoring Plan (EA 1999b), are shown on this table.
Concentrations highlighted with gray and bold type denote exceedance of MEG or MCL.

TABLE 5R GROUNDWATER EXTRACTION FLOW RATE AND RUN TIME SUMMARY, 1 JANUARY – 31 DECEMBER 2001
GROUND-WATER EXTRACTION AND TREATMENT SYSTEM (BUILDING 50)

	DATE															
	1/1/01	1/2/01	1/3/01	1/4/01	1/5/01	1/6/01	1/7/01	1/8/01	1/9/01	1/10/01	1/11/01	1/12/01	1/13/01	1/14/01	1/15/01	1/16/01
EW-1																
Flow rate (gpm)	3	3	3	3	3	3	3	3	0	3	3	3	3	3	3	3
Run time (hours)	24	24	24	24	24	24	24	15	0	12.5	23.75	24	24	21	24	21.25
EW-2A																
Flow rate (gpm)	20	20	20	20	20	20	20	20	0	20	20	20	20	20	20	20
Run time (hours)	24	24	24	24	24	24	24	15	0	12.5	23.75	24	24	21	24	21.25
EW-4																
Flow rate (gpm)	18	18	18	18	18	18	18	18	0	18	18	18	18	18	18	18
Run time (hours)	24	24	24	24	24	24	24	15	0	12.5	23.75	24	24	21	24	21.75
EW-5																
Flow rate (gpm)	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0
Run time (hours)	24	24	24	24	12	0	0	0	0	0	0	0	0	0	0	0
EW-5A																
Flow rate (gpm)	0	0	0	0	0	0	0	0	0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Run time (hours)	0	0	0	0	0	0	0	0	0	12.5	23.75	24	23	21	19	21.75

	DATE															
	1/17/01	1/18/01	1/19/01	1/20/01	1/21/01	1/22/01	1/23/01	1/24/01	1/25/01	1/26/01	1/27/01	1/28/01	1/29/01	1/30/01	1/31/01	
EW-1																
Flow rate (gpm)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	22.5	24	
EW-2A																
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	22.5	24	
EW-4																
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	22.5	24	
EW-5																
Flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Run time (hours)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EW-5A																
Flow rate (gpm)	4.5	2.5	2.5	2.5	0	2.5	2.5	4	4	4	4	4	4	4	4	
Run time (hours)	19.5	18	19	13	0	14	13.5	24	24	24	24	24	24	22.5	24	

NOTE: EW-5 was taken out of service on 8 January 2001 and was decommissioned on 17 January 2001. EW-5A was brought online on 10 January 2001.

	DATE														
	2/1/01	2/2/01	2/3/01	2/4/01	2/5/01	2/6/01	2/7/01	2/8/01	2/9/01	2/10/01	2/11/01	2/12/01	2/13/01	2/14/01	2/15/01
EW-1															
Flow rate (gpm)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Run time (hours)	24	24	24	24	24	19.5	16	20.5	19.5	17	24	24	24	24	24
EW-2A															
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Run time (hours)	24	24	24	24	24	19.5	16	20.5	19.5	16	24	24	24	24	24
EW-4															
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Run time (hours)	24	24	24	24	24	19.5	16	20.5	19.5	16	24	24	24	24	24
EW-5A															
Flow rate (gpm)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6	6	6	6	6	6	6	6
Run time (hours)	24	24	24	24	24	19.5	16	20.5	19.5	16	24	24	24	24	24

	DATE													
	2/16/01	2/17/01	2/18/01	2/19/01	2/20/01	2/21/01	2/22/01	2/23/01	2/24/01	2/25/01	2/26/01	2/27/01	2/28/01	
EW-1														
Flow rate (gpm)	3	3	3	3	3	3	3	3	3	3	3	3	3	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	
EW-2A														
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	
EW-4														
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	
EW-5A														
Flow rate (gpm)	7	7	7	8	9	9	9	9	9	9	10	8	8	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	

	DATE															
	3/1/01	3/2/01	3/3/01	3/4/01	3/5/01	3/6/01	3/7/01	3/8/01	3/9/01	3/10/01	3/11/01	3/12/01	3/13/01	3/14/01	3/15/01	3/16/01
EW-1																
Flow rate (gpm)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-2A																
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-4																
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-5A																
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	DATE															
	3/17/01	3/18/01	3/19/01	3/20/01	3/21/01	3/22/01	3/23/01	3/24/01	3/25/01	3/26/01	3/27/01	3/28/01	3/29/01	3/30/01	3/31/01	
EW-1																
Flow rate (gpm)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
EW-2A																
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
EW-4																
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
EW-5A																
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	

	DATE														
	4/1/01	4/2/01	4/3/01	4/4/01	4/5/01	4/6/01	4/7/01	4/8/01	4/9/01	4/10/01	4/11/01	4/12/01	4/13/01	4/14/01	4/15/01
EW-1															
Flow rate (gpm)	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-2A															
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-4															
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-5A															
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	DATE														
	4/16/01	4/17/01	4/18/01	4/19/01	4/20/01	4/21/01	4/22/01	4/23/01	4/24/01	4/25/01	4/26/01	4/27/01	4/28/01	4/29/01	4/30/01
EW-1															
Flow rate (gpm)	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0
Run time (hours)	24	24	24	24	24	24	24	13	0	0	0	0	0	0	0
EW-2A															
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	20	24	24	24
EW-4															
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	20	24	24	24
EW-5A															
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	20	24	24	24

NOTE: EW-1 was not operational from 24 to 30 April 2001 due to pump replacement and restricted access to the Weapons Compound.

	DATE															
	5/1/01	5/2/01	5/3/01	5/4/01	5/5/01	5/6/01	5/7/01	5/8/01	5/9/01	5/10/01	5/11/01	5/12/01	5/13/01	5/14/01	5/15/01	5/16/01
EW-1																
Flow rate (gpm)	0	0	0	0	0	0	0	0	6	6	6	6	6	6	6	6
Run time (hours)	0	0	0	0	0	0	0	0	24	24	24	24	24	24	24	24
EW-2A																
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-4																
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
EW-5A																
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	DATE															
	5/17/01	5/18/01	5/19/01	5/20/01	5/21/01	5/22/01	5/23/01	5/24/01	5/25/01	5/26/01	5/27/01	5/28/01	5/29/01	5/30/01	5/31/01	
EW-1																
Flow rate (gpm)	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	
Run time (hours)	24	24	24	24	24	23.5	24	24	24	24	24	23	24	23.5	23.25	
EW-2A																
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Run time (hours)	24	24	24	24	24	23.5	24	24	24	24	24	23	24	23.5	23.25	
EW-4																
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
Run time (hours)	24	24	24	24	24	23.5	24	24	24	24	24	23	24	23.5	23.25	
EW-5A																
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	8	10	10	10	
Run time (hours)	24	24	24	24	24	23.5	24	24	24	24	24	23	24	23.5	23.25	

NOTE: From 1 to 8 May 2001, extraction well EW-1 was being re-developed following replacement of the pump and pump piping.

	6/1/01	6/2/01	6/3/01	6/4/01	6/5/01	6/6/01	6/7/01	6/8/01	6/9/01	6/10/01	6/11/01	6/12/01	6/13/01	6/14/01	6/15/01
EW-1															
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Run time (hours)	24	24	24	24	24	24	24	24	24	24	19	24	24	24	24
EW-2A															
Flow rate (gpm)	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Run time (hours)	24	24	24	24	24	24	24	24	24	24	19	24	24	24	24
EW-4															
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Run time (hours)	24	24	24	24	24	24	24	24	24	24	19	24	24	24	24
EW-5A															
Flow rate (gpm)	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10
Run time (hours)	24	24	24	24	24	24	24	24	24	24	19	24	15.5	15	24

	6/16/01	6/17/01	6/18/01	6/19/01	6/20/01	6/21/01	6/22/01	6/23/01	6/24/01	6/25/01	6/26/01	6/27/01	6/28/01	6/29/01	6/30/01
EW-1															
Flow rate (gpm)	8	8	8	8	8	8	8	8	8	8	8	10	10	10	10
Run time (hours)	24	24	24	24	15	15.75	24	24	24	24	24	23	24	22.5	24
EW-2A															
Flow rate (gpm)	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Run time (hours)	24	24	24	24	15	15.75	24	24	24	24	24	23	24	22.5	24
EW-4															
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	21	21	21	21
Run time (hours)	24	24	24	24	15	15.75	24	24	24	24	24	23	24	22.5	24
EW-5A															
Flow rate (gpm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Run time (hours)	24	24	24	24	15	15.75	24	24	24	24	24	23	24	22.5	24

	DATE															
	7/1/01	7/2/01	7/3/01	7/4/01	7/5/01	7/6/01	7/7/01	7/8/01	7/9/01	7/10/01	7/11/01	7/12/01	7/13/01	7/14/01	7/15/01	7/16/01
EW-1																
Flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Run time (hours)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EW-2A																
Flow rate (gpm)	20	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20
Run time (hours)	24	0	0	0	0	0	0	0	14.5	24	24	24	23.5	24	24	24
EW-4																
Flow rate (gpm)	18	0	0	0	0	0	0	0	18	18	18	18	18	18	18	18
Run time (hours)	24	0	0	0	0	0	0	0	14.5	24	24	24	23.5	24	24	24
EW-5A																
Flow rate (gpm)	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Run time (hours)	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	DATE															
	7/17/01	7/18/01	7/19/01	7/20/01	7/21/01	7/22/01	7/23/01	7/24/01	7/25/01	7/26/01	7/27/01	7/28/01	7/29/01	7/30/01	7/31/01	
EW-1																
Flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Run time (hours)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EW-2A																
Flow rate (gpm)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	23.5	24	
EW-4																
Flow rate (gpm)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
Run time (hours)	24	24	24	24	24	24	24	24	24	24	24	24	24	23.5	24	
EW-5A																
Flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Run time (hours)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

	DATE															
	8/1/01	8/2/01	8/3/01	8/4/01	8/5/01	8/6/01	8/7/01	8/8/01	8/9/01	8/10/01	8/11/01	8/12/01	8/13/01	8/14/01	8/15/01	8/16/01
EW-1																
Flow rate (gpm)	0	0	0	0	0	0	0	0	9.0	0	0	0	0	0	0	0
Run time (hours)	0	0	0	0	0	0	0	0	7.5	0	0	0	0	0	0	0
EW-2A																
Flow rate (gpm)	20	20	20	20	20	17	17	17	17	17	17	17	17	16	17	16
Run time (hours)	24	24	24	24	24	24	24	23.5	23.5	24	24	24	23.5	24	24	24
EW-4																
Flow rate (gpm)	18	18	18	18	18	21	24	23	22	22	22	22	22	22	22	22
Run time (hours)	24	24	24	24	24	24	24	23.5	23.5	24	24	24	23.5	24	24	24
EW-5A																
Flow rate (gpm)	0	0	0	0	0	0	0	7	7	10	10	10	10	10	10	10
Run time (hours)	0	0	0	0	0	0	0	23.5	23.5	24	24	24	12.25	14.25	24	24

	DATE															
	8/17/01	8/18/01	8/19/01	8/20/01	8/21/01	8/22/01	8/23/01	8/24/01	8/25/01	8/26/01	8/27/01	8/28/01	8/29/01	8/30/01	8/31/01	
EW-1																
Flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	
Run time (hours)	0	0	0	0	0	0	0	0	0	0	0	0	0	23	24	
EW-2A																
Flow rate (gpm)	17	17	17	16	16	16	16	16	16	16	17	16	16	17	17	
Run time (hours)	24	24	24	24	24	24	23.5	24	24	10.9	24	24	23.5	24	24	
EW-4																
Flow rate (gpm)	21	21	21	21	21	21	21	22	21	21	21	22	22	22	22	
Run time (hours)	24	24	24	24	24	24	23.5	24	24	10.9	24	24	23.5	24	24	
EW-5A																
Flow rate (gpm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Run time (hours)	24	24	24	24	24	24	23.5	24	24	10.9	24	24	23.5	24	24	

NOTE: EW-1 was off until 29 August 2001 due to high iron content causing rapid filter clogging; restarted at reduced flow rate on 29 August 2001.

	DATE														
	9/1/01	9/2/01	9/3/01	9/4/01	9/5/01	9/6/01	9/7/01	9/8/01	9/9/01	9/10/01	9/11/01	9/12/01	11/13/01	11/14/01	11/15/01
EW-1															
Flow rate (gpm)	6	6	6	6	10	10	9	9	9	9	9	0	10	10	0
Run time (hours)	24	21.75	24	23.75	23.75	24	24	24	24	24	11.32	0	2.35	5.50	0
EW-2A															
Flow rate (gpm)	17	17	17	17	17	17	17	17	17	17	17	0	16	16	16
Run time (hours)	24	21.75	24	23.75	23.75	24	24	24	24	24	11.32	0	11.85	23.75	24
EW-4															
Flow rate (gpm)	22	22	22	22	22	22	21	21	21	22	22	0	22	22	22
Run time (hours)	24	21.75	24	23.75	23.75	24	24	24	24	24	11.32	0	11.85	23.75	24
EW-5A															
Flow rate (gpm)	10	10	10	10	10	10	10	10	10	10	10	0	10	10	10
Run time (hours)	24	21.75	24	23.75	23.75	24	24	24	24	24	11.32	0	11.85	23.75	24

	DATE														
	11/16/01	11/17/01	11/18/01	11/19/01	11/20/01	11/21/01	11/22/01	11/23/01	11/24/01	11/25/01	11/26/01	11/27/01	11/28/01	11/29/01	11/30/01
EW-1															
Flow rate (gpm)	0	0	0	9	9	9	9	9	9	9	9	9	9	9	9
Run time (hours)	0	0	0	15.33	23.75	24	24	24	24	24	24	24	24	24	24
EW-2A															
Flow rate (gpm)	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Run time (hours)	24	24	24	24	23.75	24	24	24	24	24	24	24	24	24	24
EW-4															
Flow rate (gpm)	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Run time (hours)	24	24	24	24	23.75	24	24	24	24	24	24	24	24	24	24
EW-5A															
Flow rate (gpm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Run time (hours)	24	24	24	24	23.75	24	24	24	24	24	24	24	24	24	24

NOTE: Plant shut down at 1119 on 11 September 2001 until further notice by direction of Tony Williams. Plant restarted on 13 November 2001.

	DATE															
	12/1/01	12/2/01	12/3/01	12/4/01	12/5/01	12/6/01	12/7/01	12/8/01	12/9/01	12/10/01	12/11/01	12/12/01	12/13/01	12/14/01	12/15/01	12/16/01
EW-1																
Flow rate (gpm)	(a)	(a)	9	9	(a)	9	9	(a)	(a)	9	9	9	9	9	(a)	(a)
Run time (hours)	24	24	24	23.5	24	24	24	24	24	24	24	23	24	24	24	24
EW-2A																
Flow rate (gpm)	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Run time (hours)	24	24	24	23.5	24	24	24	24	24	24	24	23	24	24	24	24
EW-4																
Flow rate (gpm)	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Run time (hours)	24	24	24	23.5	24	24	24	24	24	24	24	23	24	24	24	24
EW-5A																
Flow rate (gpm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Run time (hours)	24	24	24	23.5	24	24	24	24	24	24	24	23	24	24	24	24

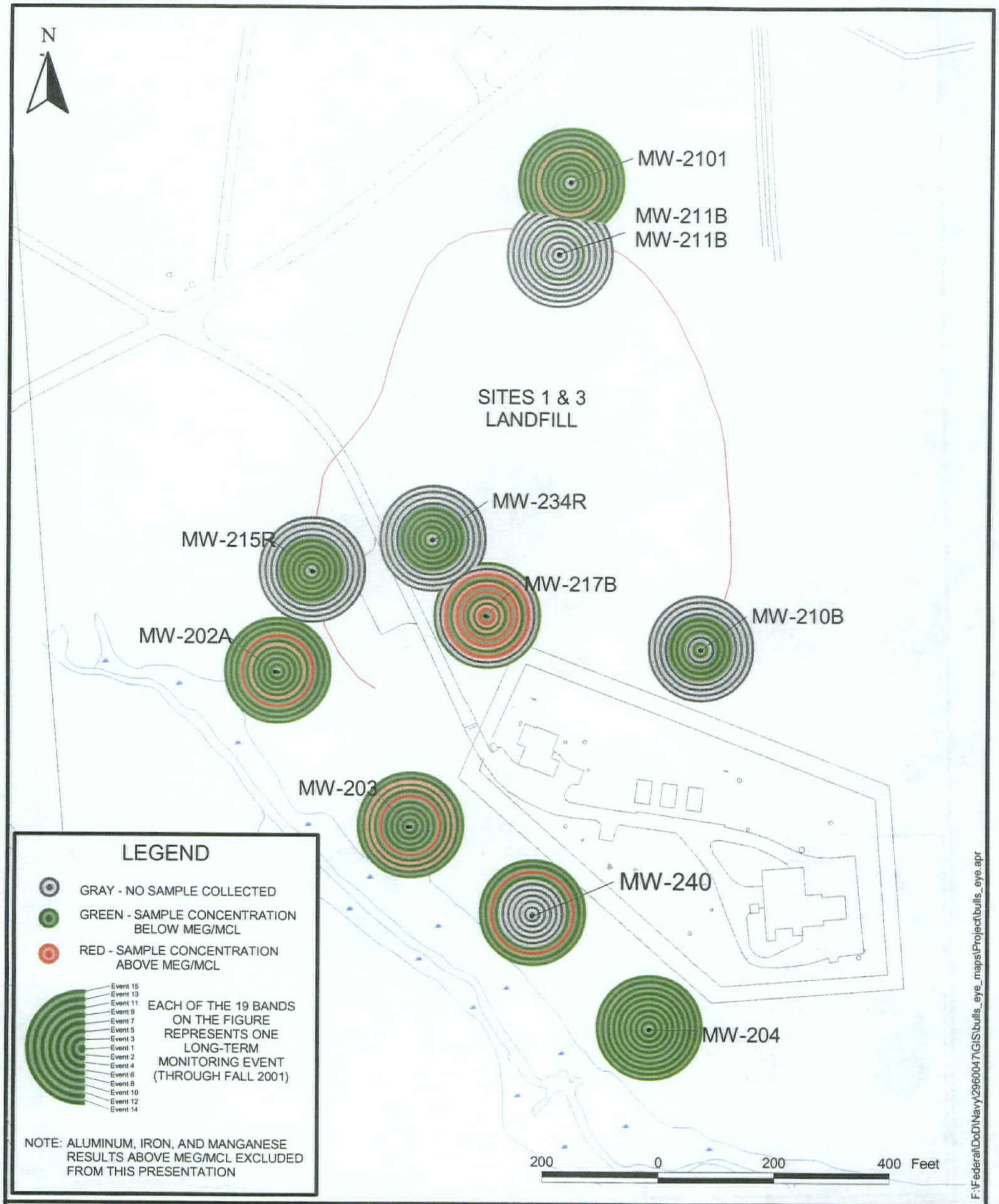
	DATE															
	12/17/01	12/18/01	12/19/01	12/20/01	12/21/01	12/22/01	12/23/01	12/24/01	12/25/01	12/26/01	12/27/01	12/28/01	12/29/01	12/30/01	12/31/01	
EW-1																
Flow rate (gpm)	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
Run time (hours)	24	24	24	24	23.75	24	24	24	24	24	24	24	24	24	24	
EW-2A																
Flow rate (gpm)	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	
Run time (hours)	24	24	24	24	23.75	24	24	24	24	24	24	24	24	24	24	
EW-4																
Flow rate (gpm)	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
Run time (hours)	24	24	24	24	23.75	24	24	24	24	24	24	24	24	24	24	
EW-5A																
Flow rate (gpm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
Run time (hours)	24	24	24	24	23.75	24	24	24	24	24	24	24	24	24	24	

Appendix B

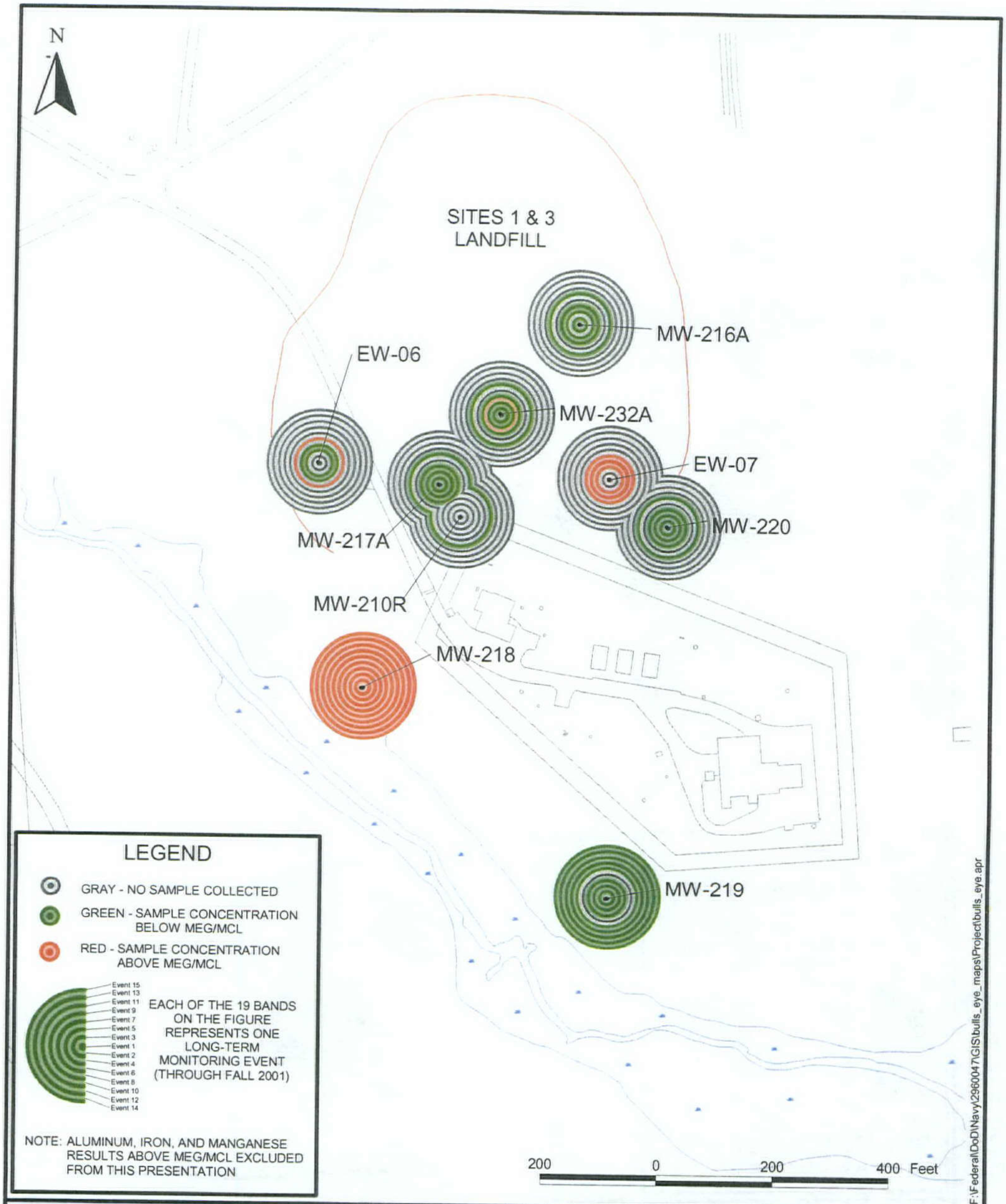
Graphical Summary of Long-Term Monitoring Program Sites 1 and 3 and Eastern Plume 1995-2001

Appendix B.1

Inorganics and Volatile Organic Compound Groundwater Concentrations Above State Maximum Exposure Guidelines/ Federal Maximum Contaminant Levels Sites 1 and 3

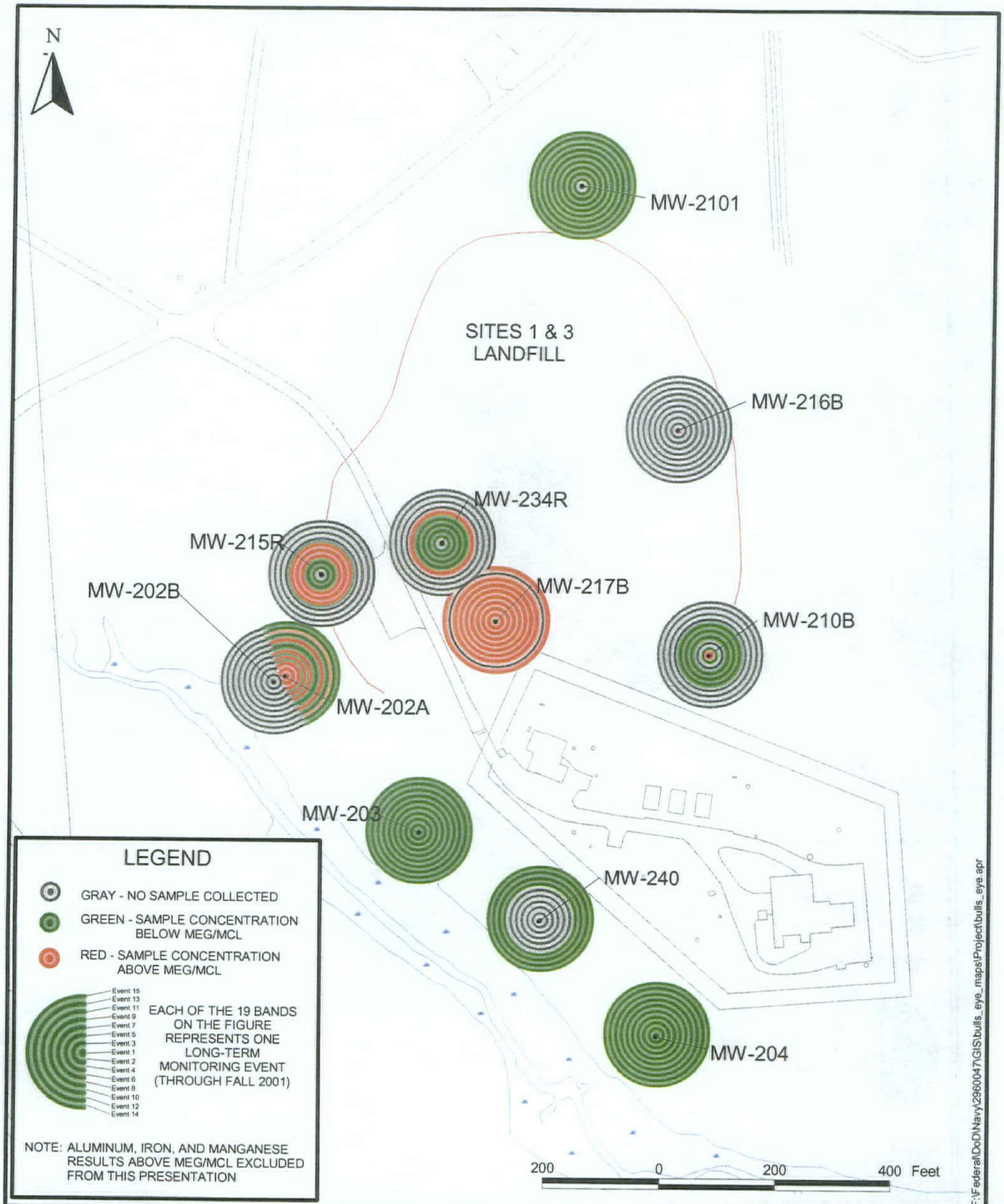


EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.			NAVAL AIR STATION BRUNSWICK BRUNSWICK, MAINE		METALS CONCENTRATIONS ABOVE MEG OR MCL IN SHALLOW WELLS, SITES 1 & 3		
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO.	FIGURE
AE	BSM	BSM	AE/GMC	AS SHOWN	FEB 2002	29600.47	B-1



F:\Federal\DoD\Navy\29600.47\GIS\bulls_eye_maps\Project\bulls_eye.apr

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.		NAVAL AIR STATION BRUNSWICK BRUNSWICK, MAINE		METALS CONCENTRATIONS ABOVE MEG OR MCL IN DEEP WELLS, SITES 1 & 3		
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO.	FIGURE
AE	BSM	BSM	AE/GMC	AS SHOWN	FEB 2002	29600.47	B-2

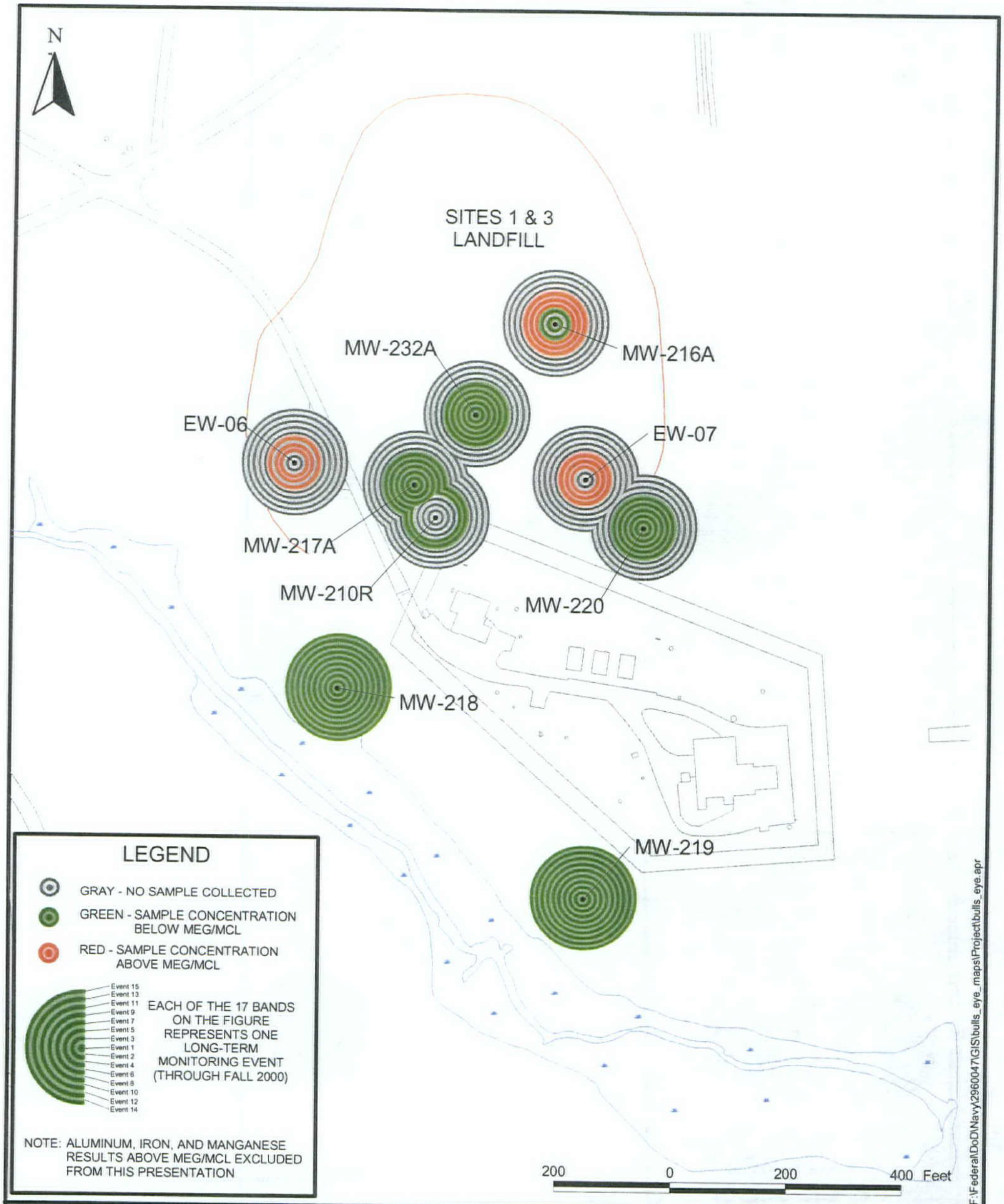


EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

NAVAL AIR STATION BRUNSWICK
BRUNSWICK, MAINE

VOC CONCENTRATIONS ABOVE MEG OR MCL IN SHALLOW WELLS, SITES 1 & 3

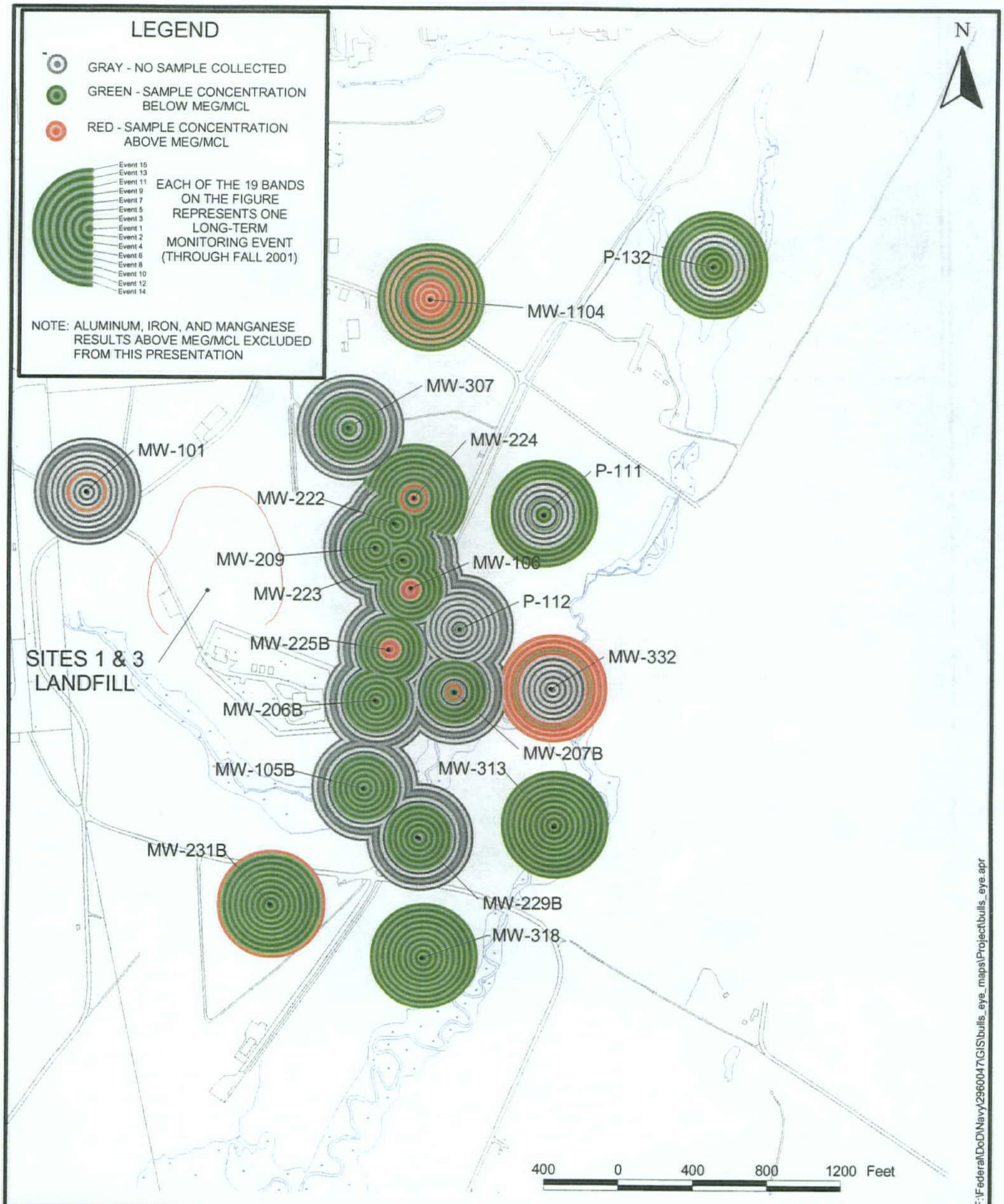
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO.	FIGURE
AE	BSM	BSM	AE/GMC	AS SHOWN	FEB 2002	29600.47	B-3



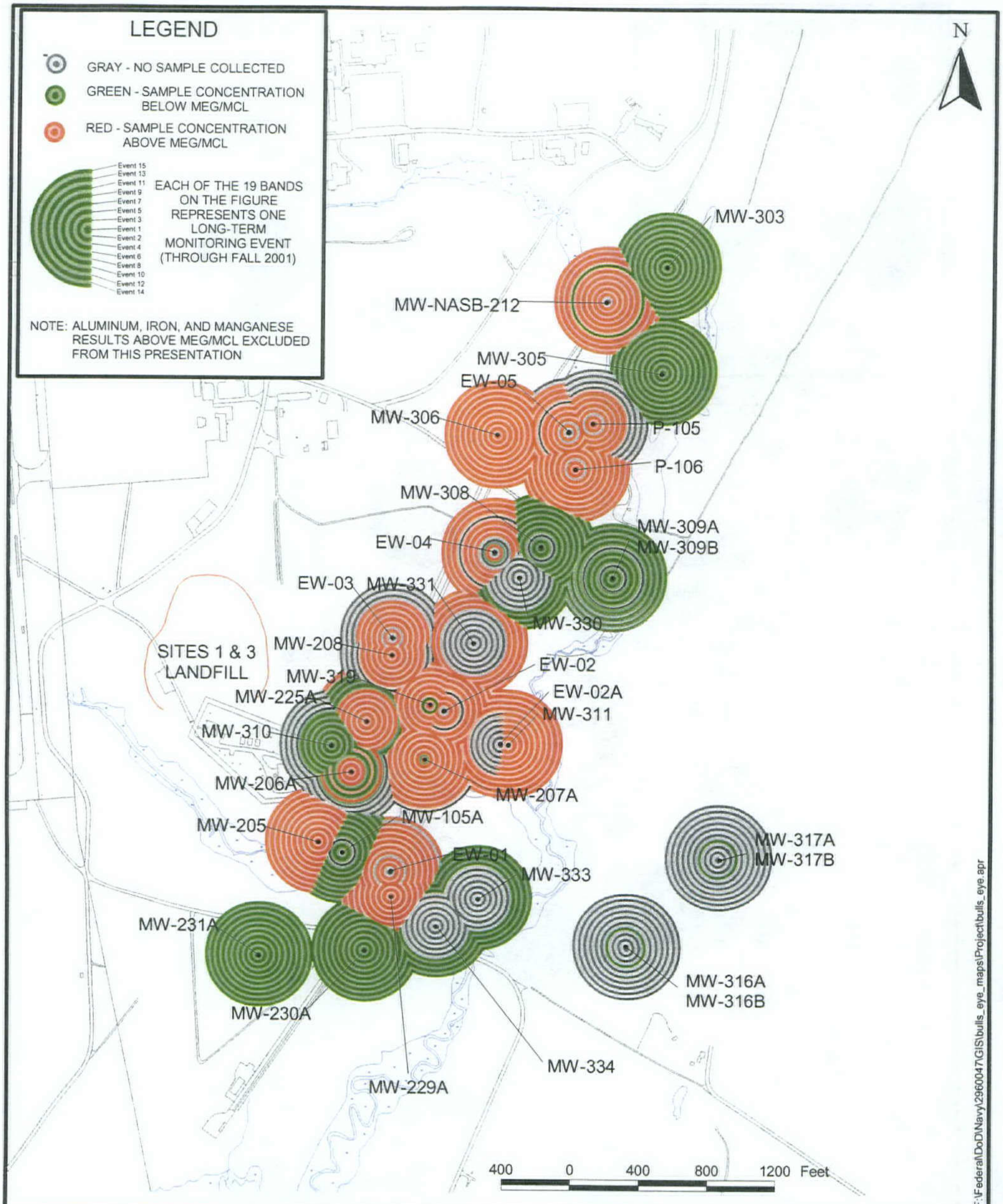
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.			NAVAL AIR STATION BRUNSWICK BRUNSWICK, MAINE		VOC CONCENTRATIONS ABOVE MEG OR MCL IN DEEP WELLS, SITES 1 & 3		
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO.	FIGURE
AE	BSM	BSM	AE/GMC	AS SHOWN	FEB 2002	29600.47	B-4

Appendix B.2

Volatile Organic Compound Groundwater Concentrations Above State Maximum Exposure Guidelines/ Federal Maximum Contaminant Levels Eastern Plume



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.			NAVAL AIR STATION BRUNSWICK BRUNSWICK, MAINE		VOC CONCENTRATIONS ABOVE MEG OR MCL IN SHALLOW WELLS, EASTERN PLUME		
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO.	FIGURE
AE	BSM	BSM	AE/GMC	AS SHOWN	FEB 2002	29600.47	B-5



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	NAVAL AIR STATION BRUNSWICK BRUNSWICK, MAINE	VOC CONCENTRATIONS ABOVE MEG OR MCL IN DEEP WELLS, EASTERN PLUME

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO.	FIGURE
AE	BSM	BSM	AE/GMC	AS SHOWN	FEB 2002	29600.47	B-6

Appendix B.3

Long-Term Monitoring Trend Results
Sites 1 and 3

- **Extraction Well Data (EW)**
- **Leachate Sediment Data (LT)**
- **Groundwater Data (MW)**
- **Stream Sediment Data (SED)**
- **Leachate Seep Data (SEEP)**
- **Extraction System Influent – Sites 1 and 3**
- **Surface Water (SW)**

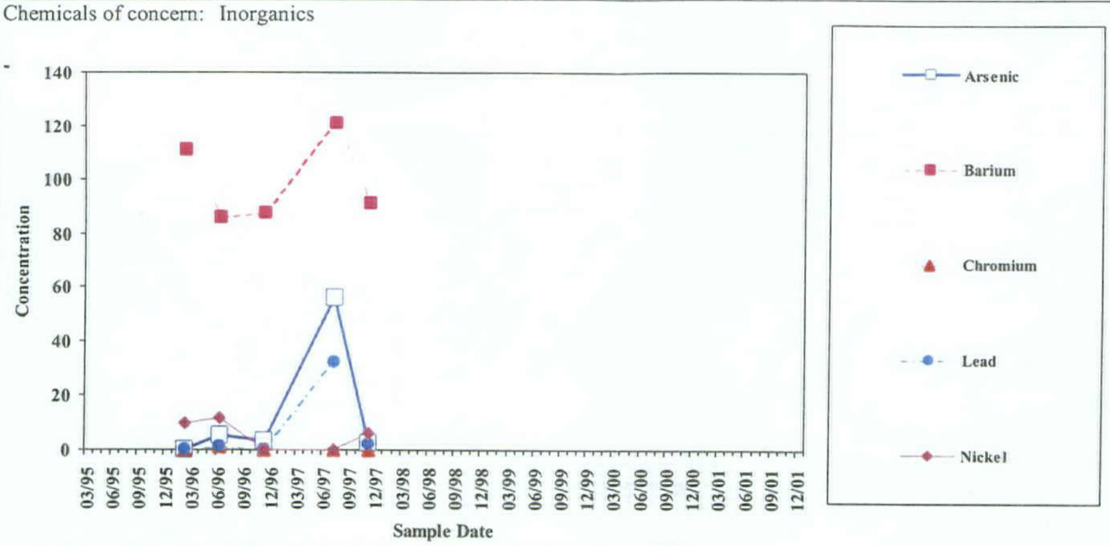
Sample Location:

EW-06

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

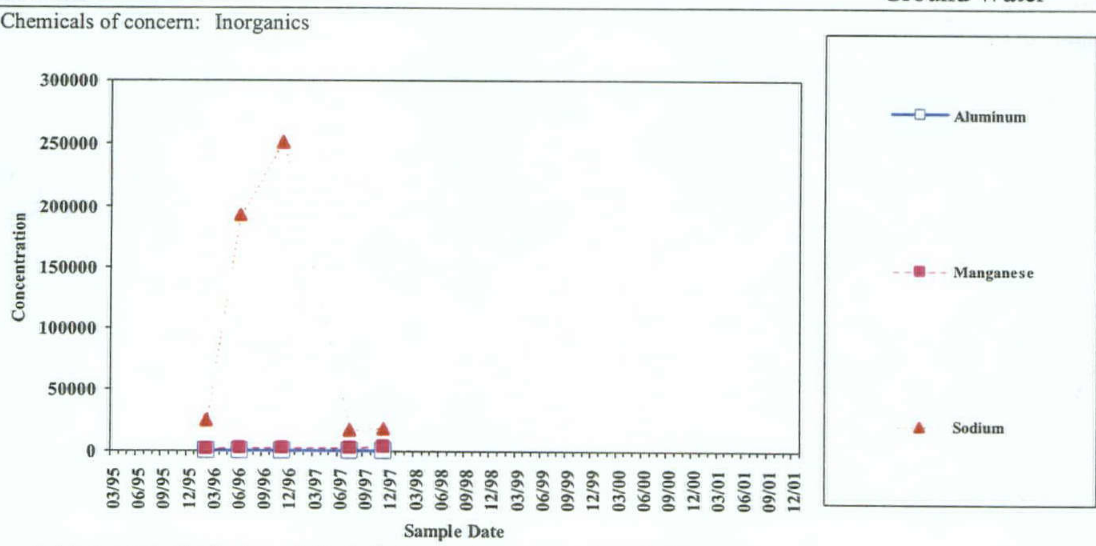
Sample Location:

EW-06

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

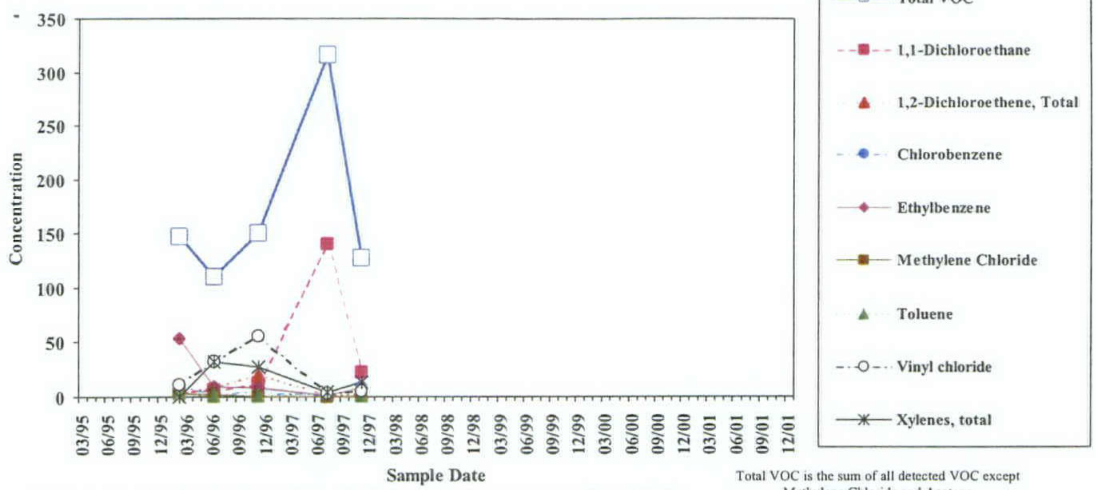
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location: **Sites 1 & 3**

EW-06

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

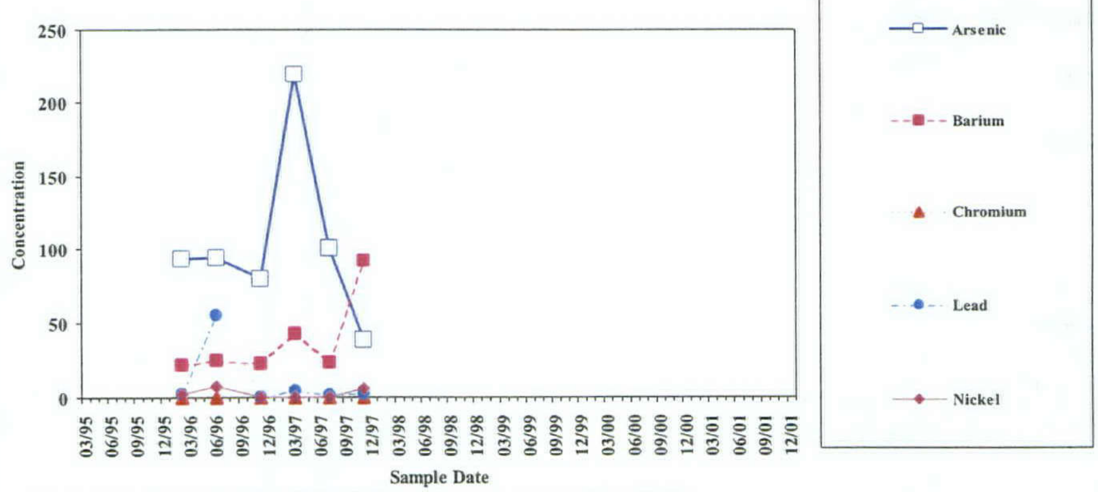
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location: **Sites 1 & 3**

EW-07

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

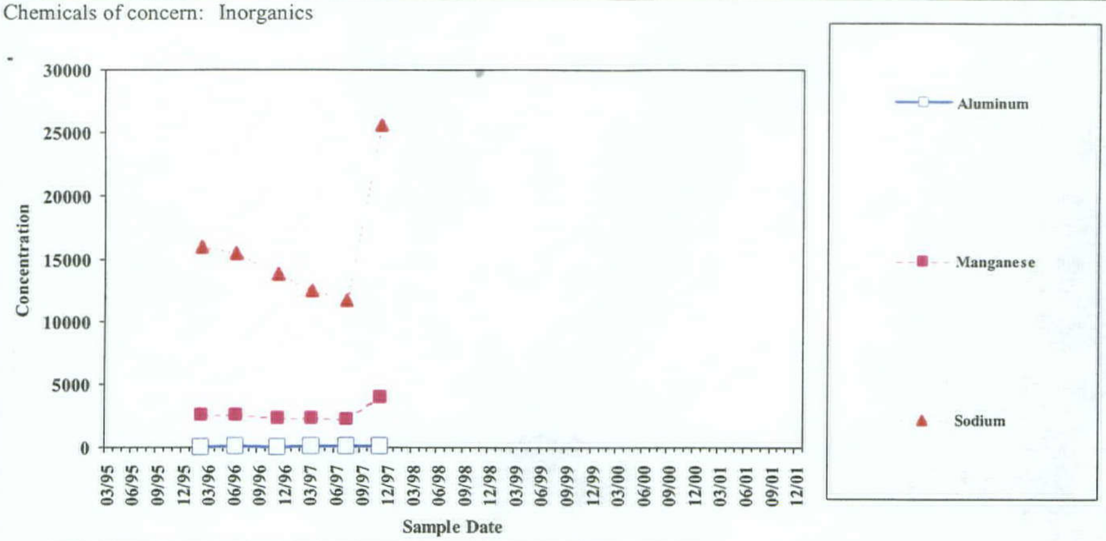
Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:

EW-07

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

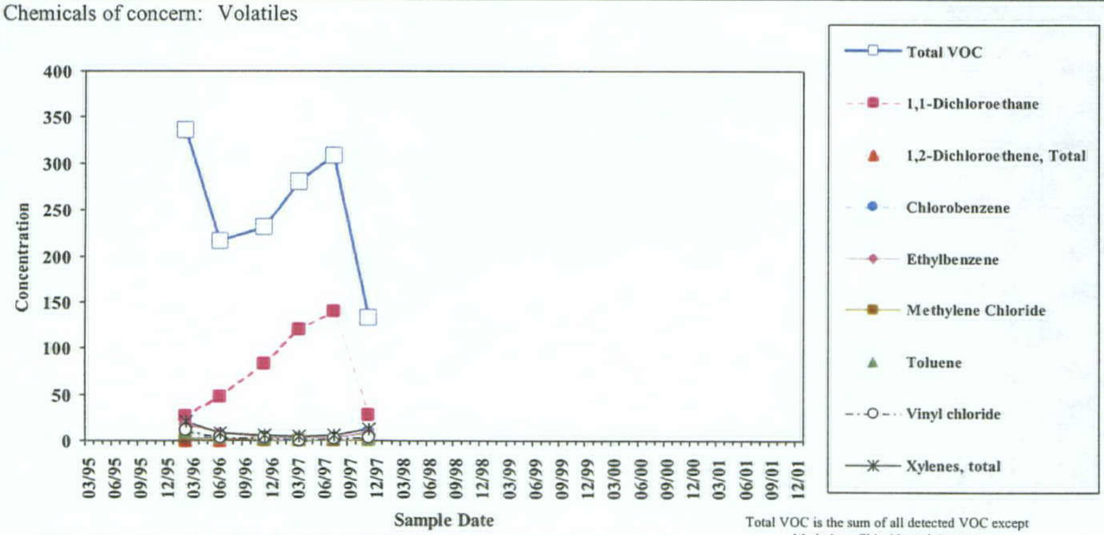
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

EW-07

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

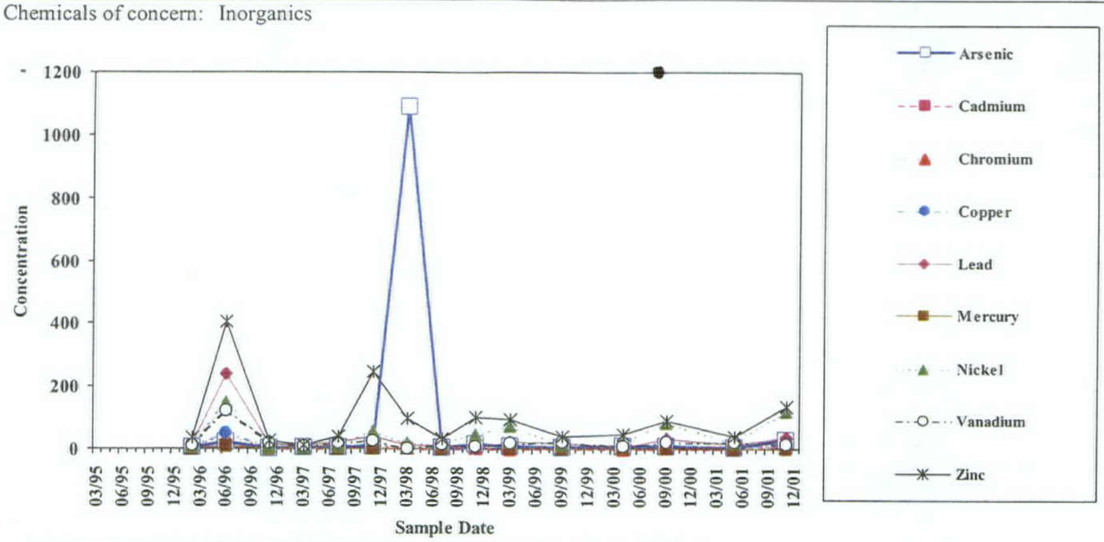
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:

LT-01

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

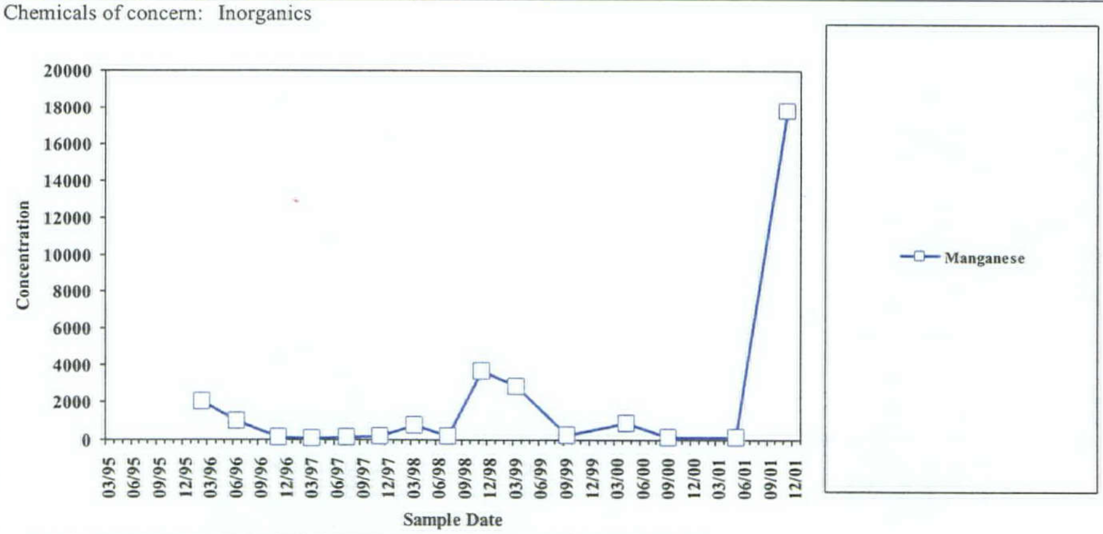
Sample concentration units: mg/Kg

Sample Location:

LT-01

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

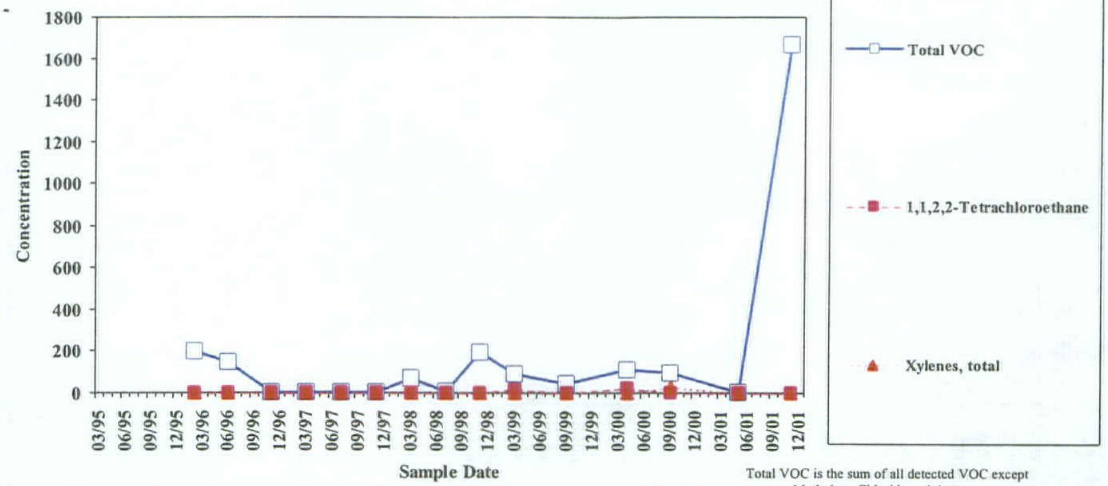
Sample Location:

LT-01

Sites 1 & 3

Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/Kg

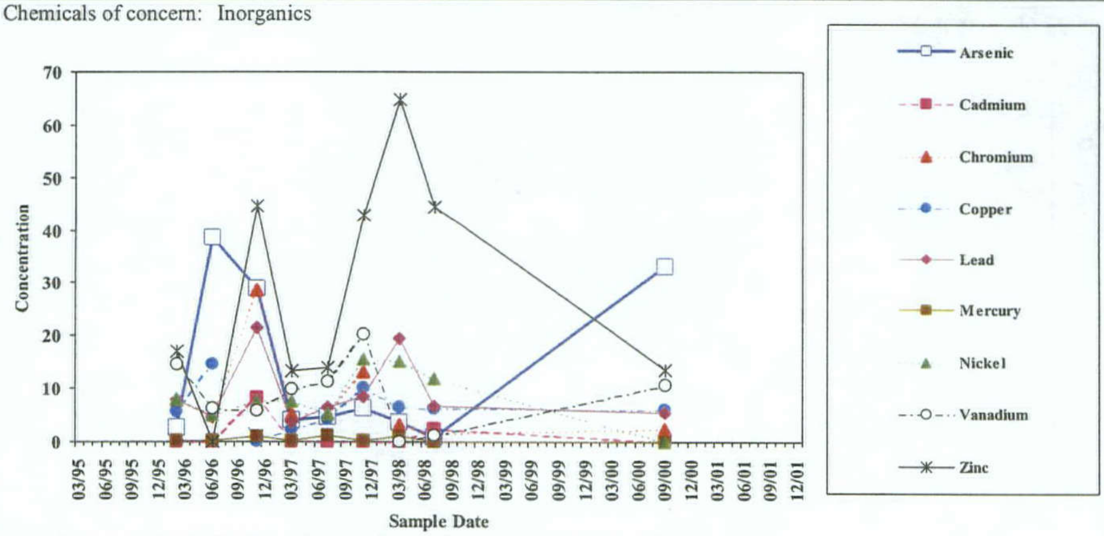
Sample Location:

LT-02

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

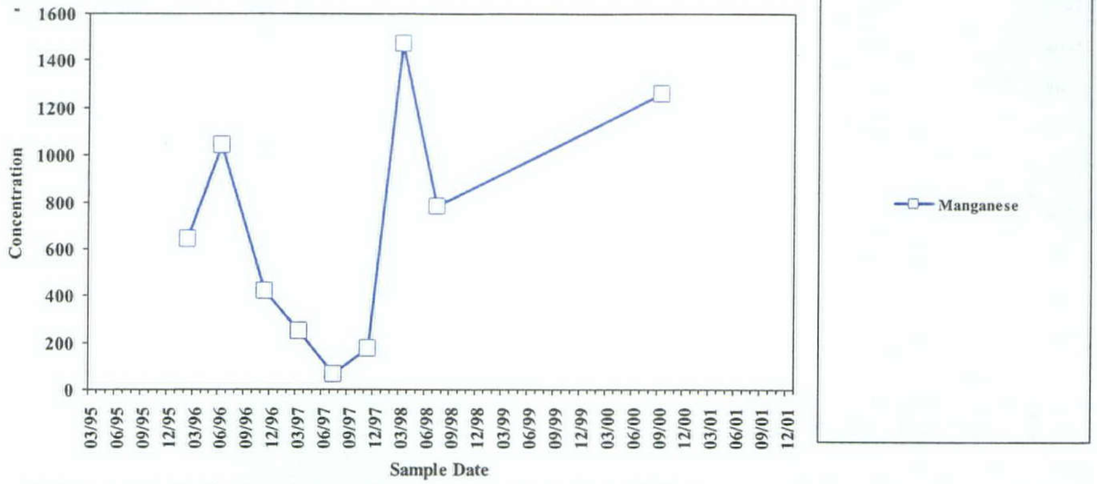
Sample concentration units: mg/Kg

Sample Location:

LT-02

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

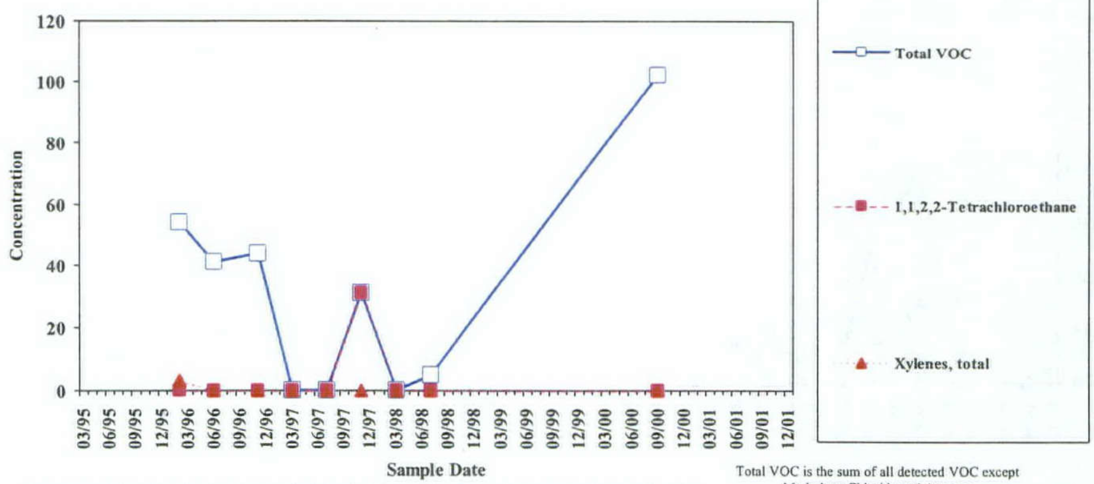
Sample concentration units: mg/Kg

Sample Location:

LT-02

Sites 1 & 3
Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/Kg

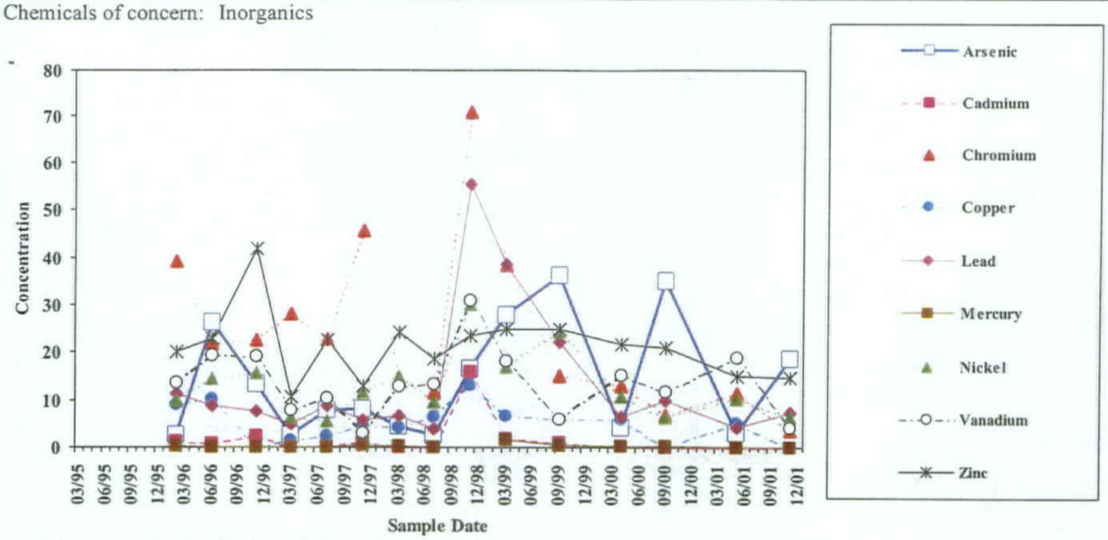
Sample Location:

LT-03

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

Figure 13 of 171

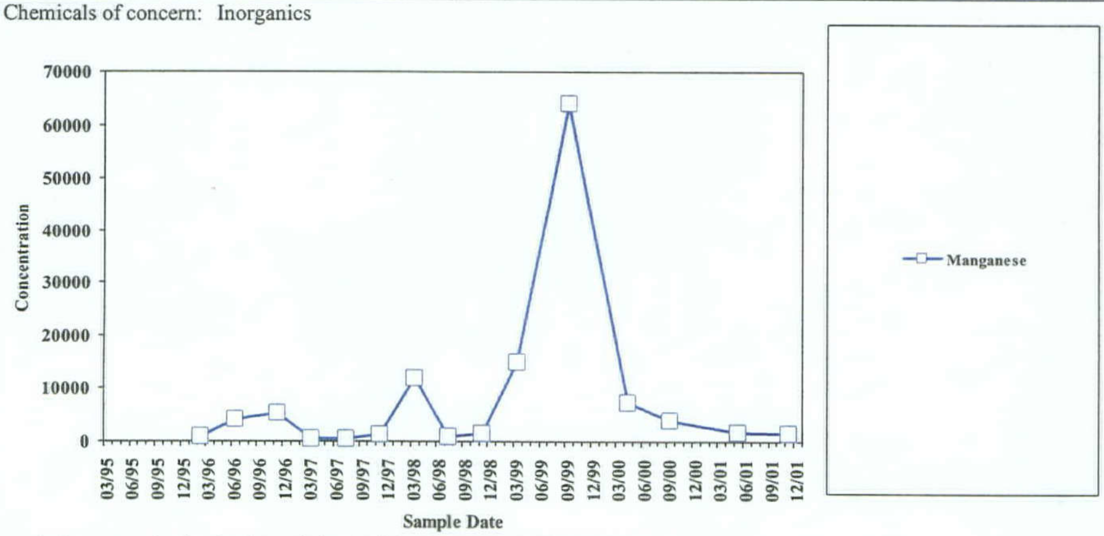
Sample Location:

LT-03

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

Figure 14 of 171

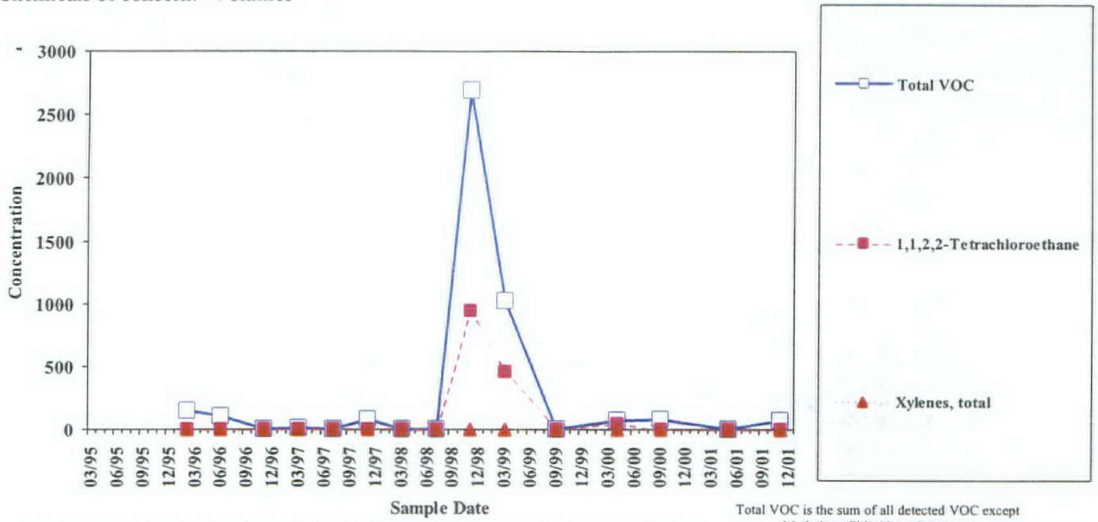
Sample Location:

LT-03

Sites 1 & 3

Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/Kg

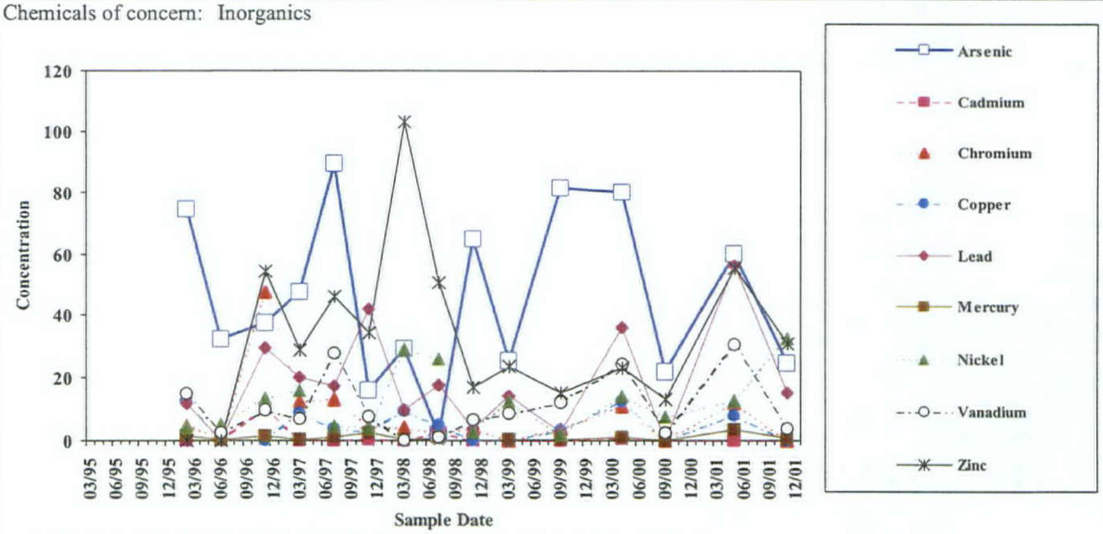
Sample Location:

LT-04

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

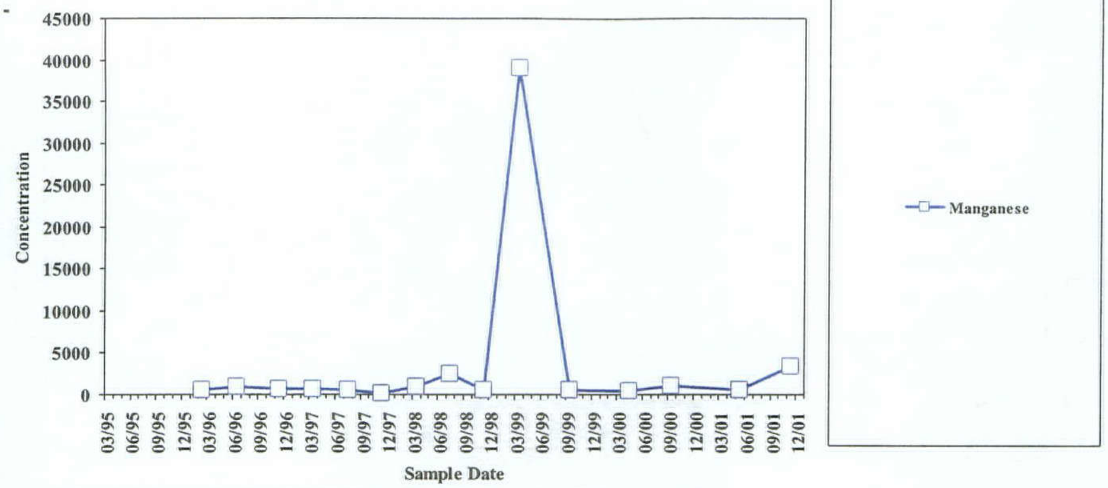
Sample Location:

LT-04

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

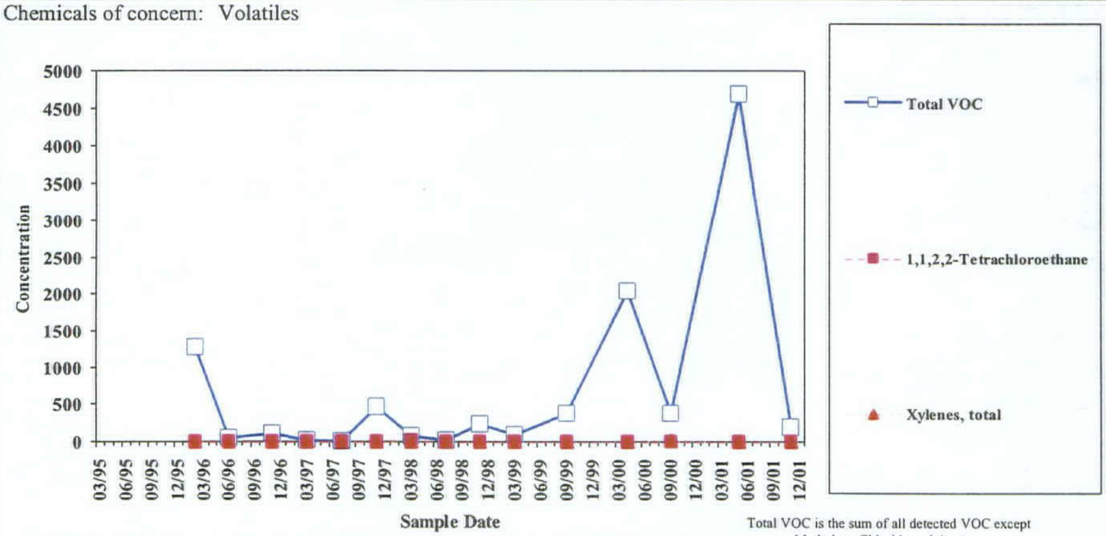
Sample Location:

LT-04

Sites 1 & 3

Sediment

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

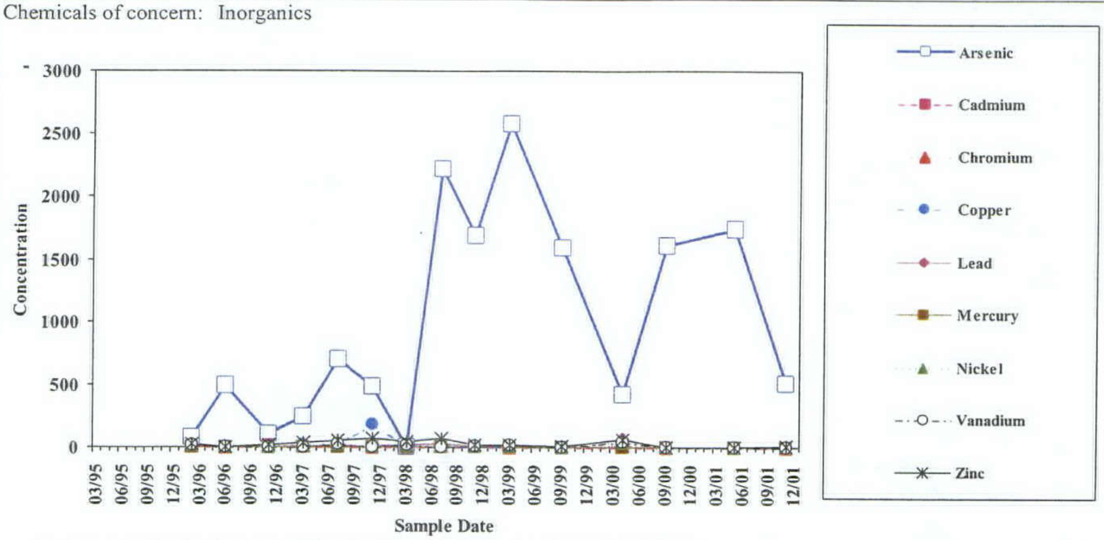
Sample concentration units: µg/Kg

Sample Location:

LT-05

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

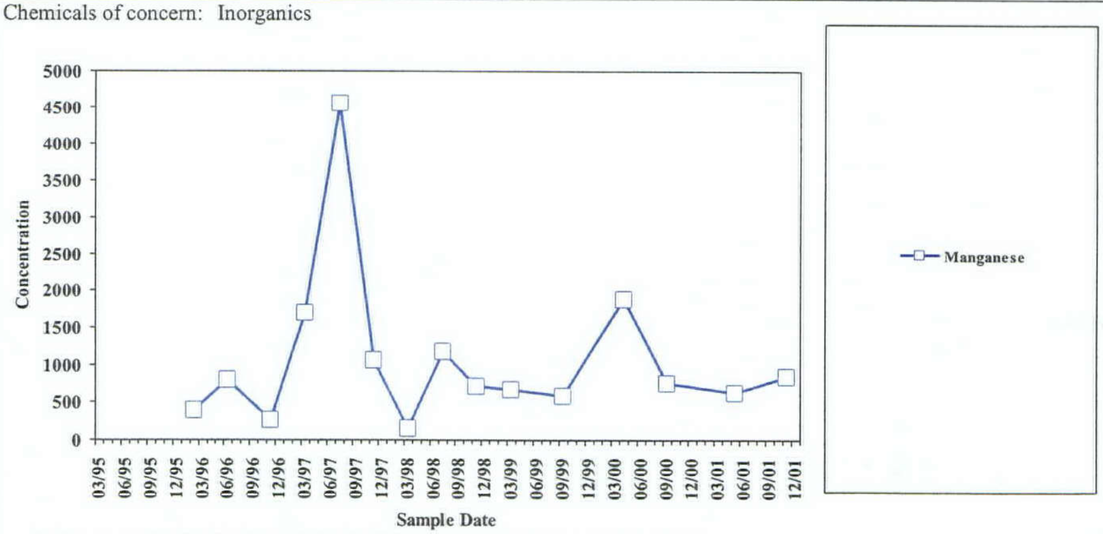
Sample concentration units: mg/Kg

Sample Location:

LT-05

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

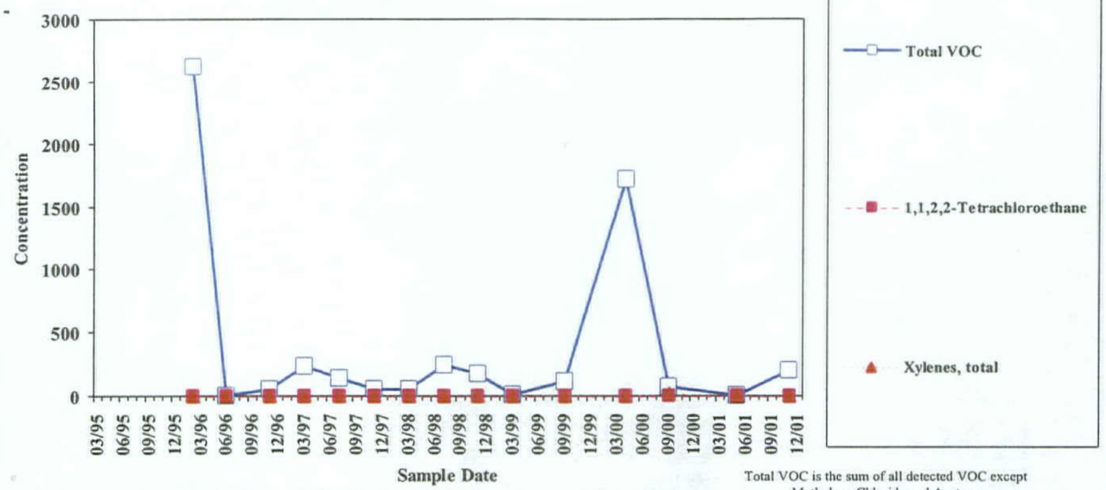
Sample concentration units: mg/Kg

Sample Location:

LT-05

Sites 1 & 3
Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/Kg

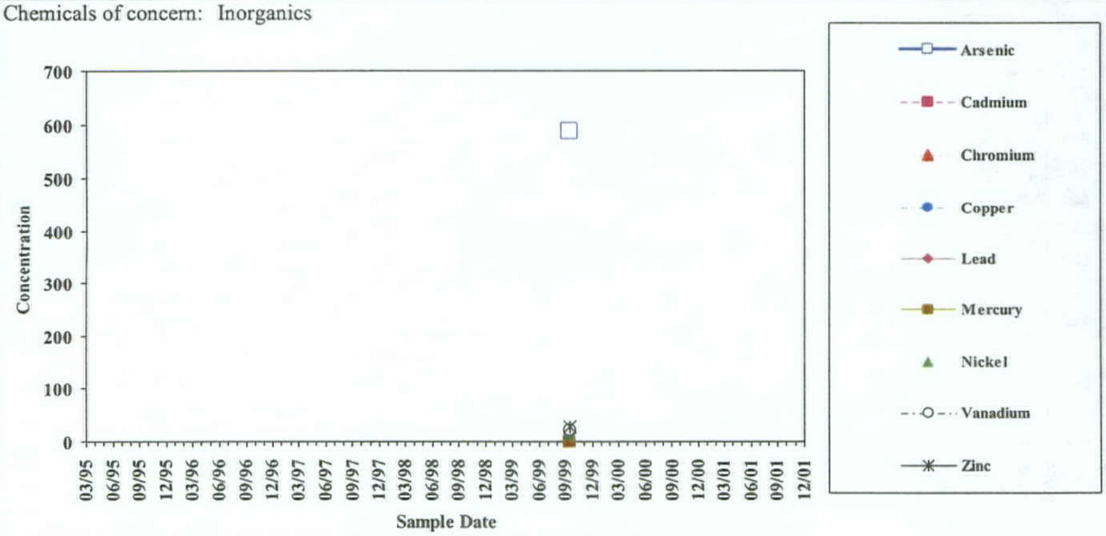
Figure 21 of 171

Sample Location:

LT-06

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: MG/KG

Figure 22 of 171

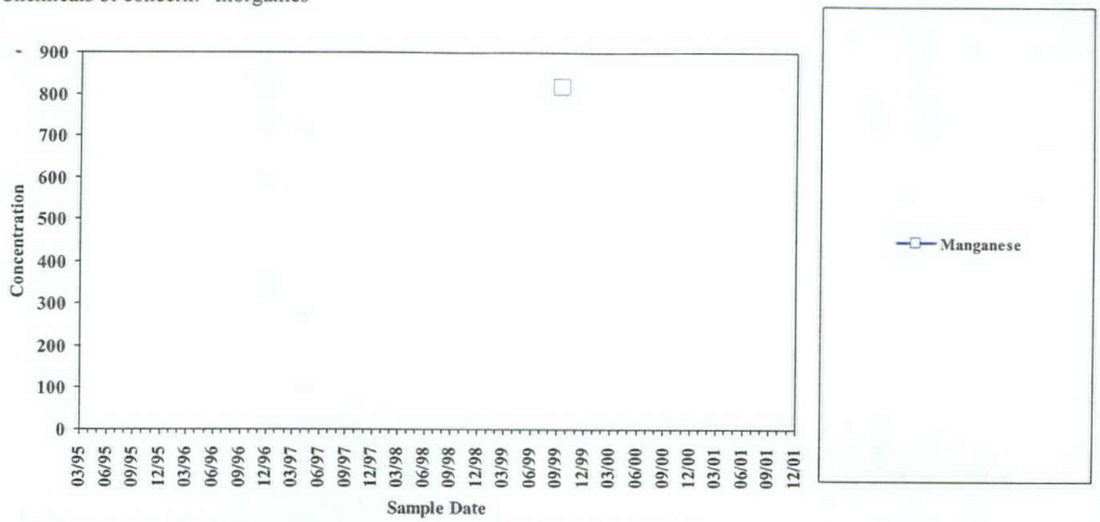
Sample Location:

LT-06

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: MG/KG

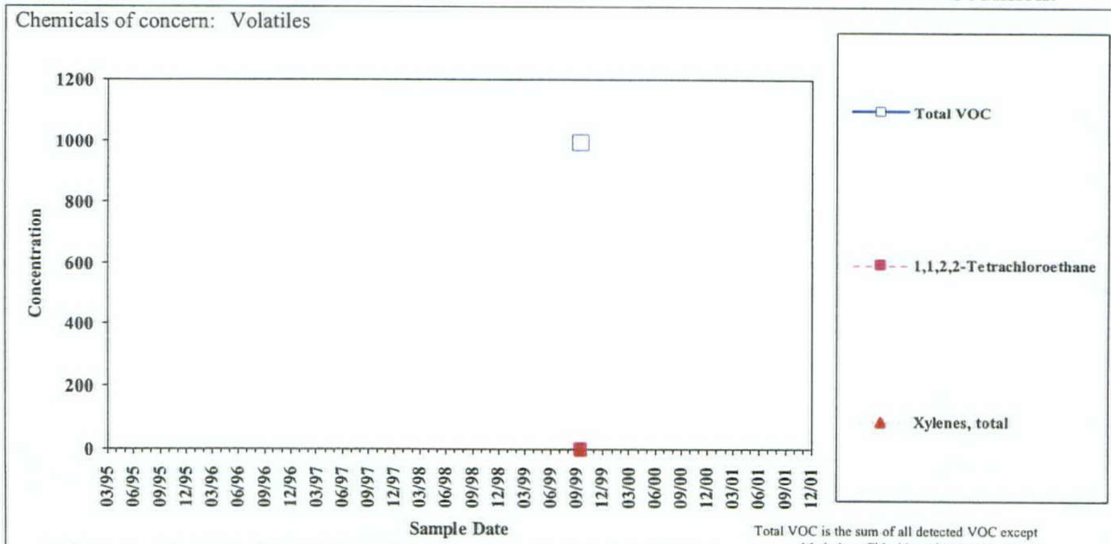
Sample Location:

LT-06

Sites 1 & 3

Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

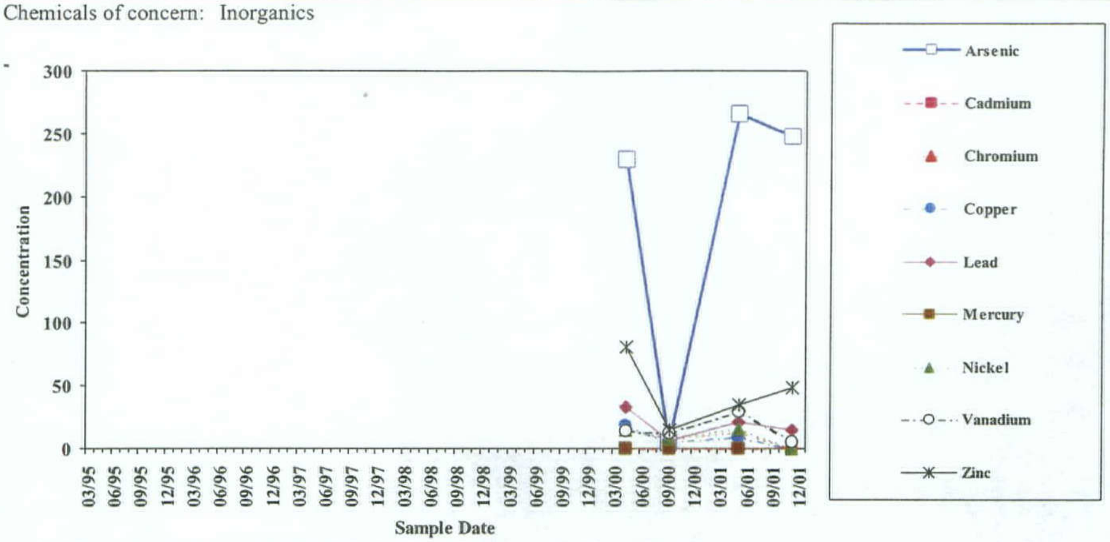
Sample concentration units: µg/Kg

Sample Location:

LT-09

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

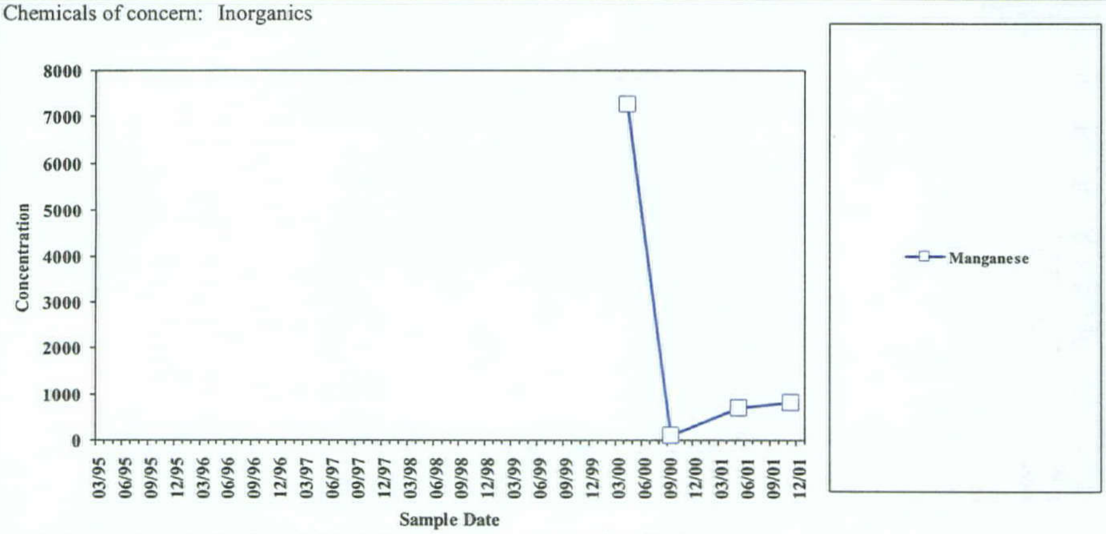
Figure 25 of 171

Sample Location:

LT-09

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

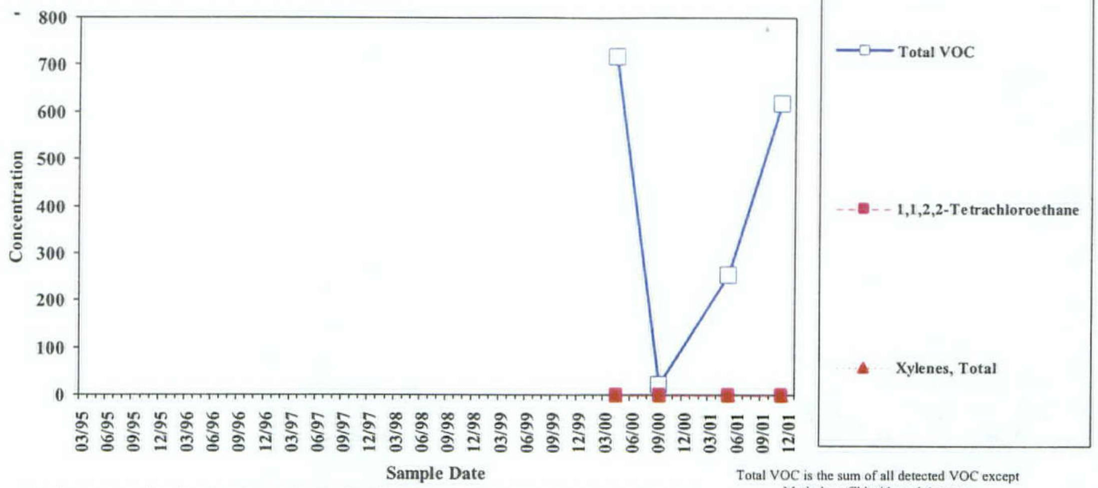
Figure 26 of 171

Sample Location:

LT-09

Sites 1 & 3
Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

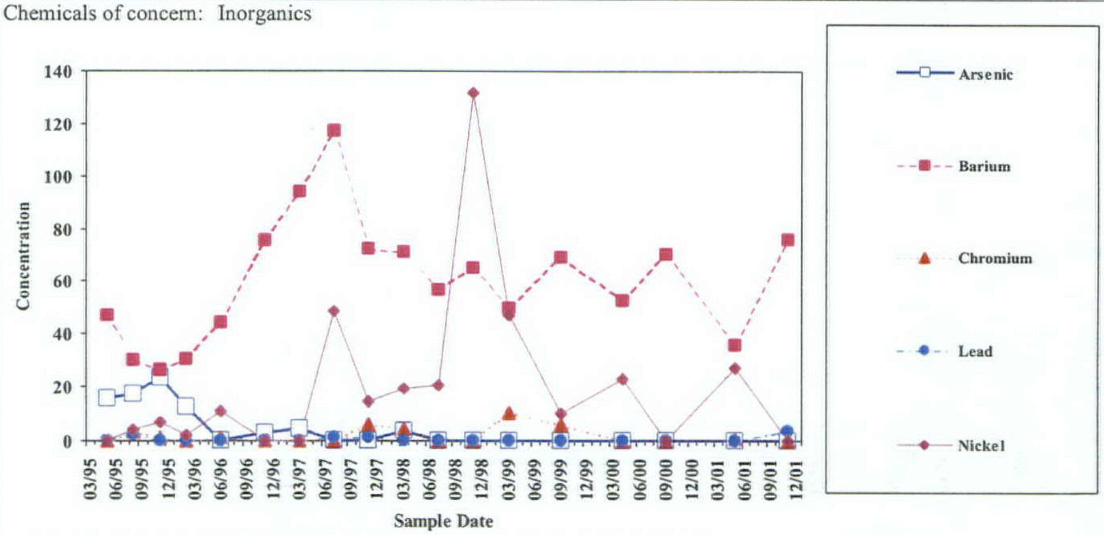
Sample concentration units: µg/Kg

Sample Location:

MW-202A

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

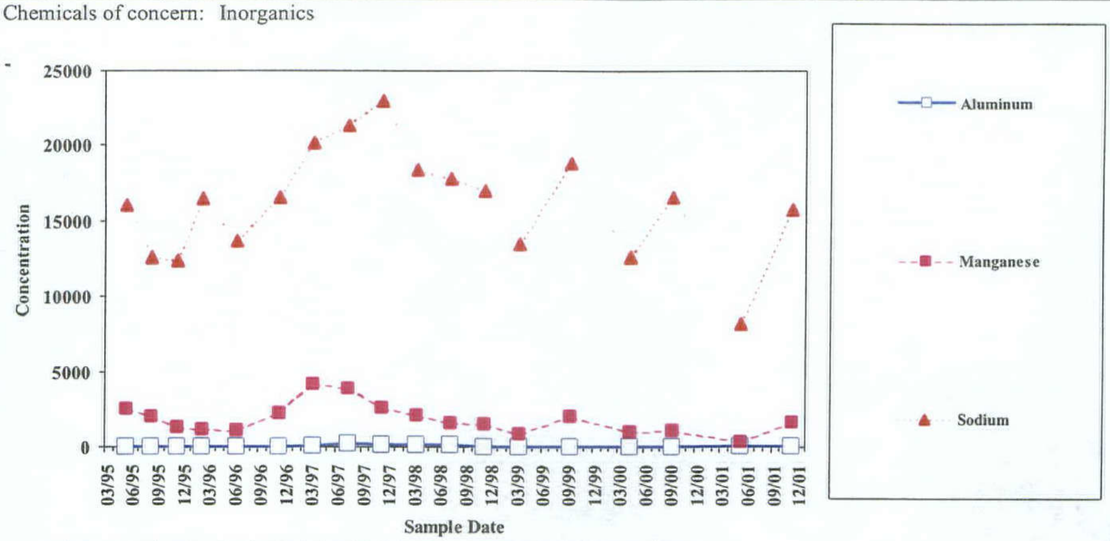
Sample Location:

MW-202A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

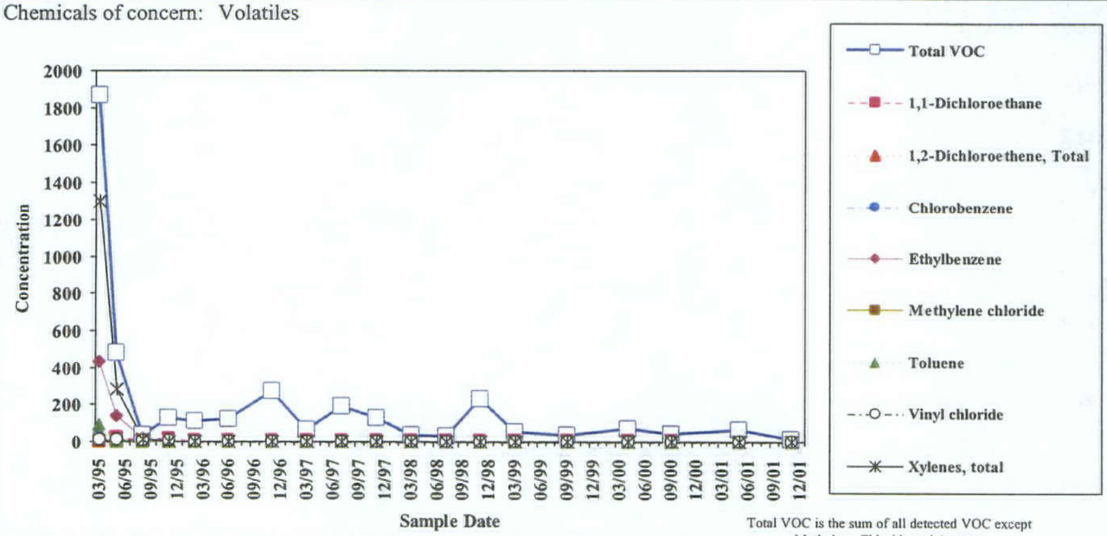
Sample Location:

MW-202A

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

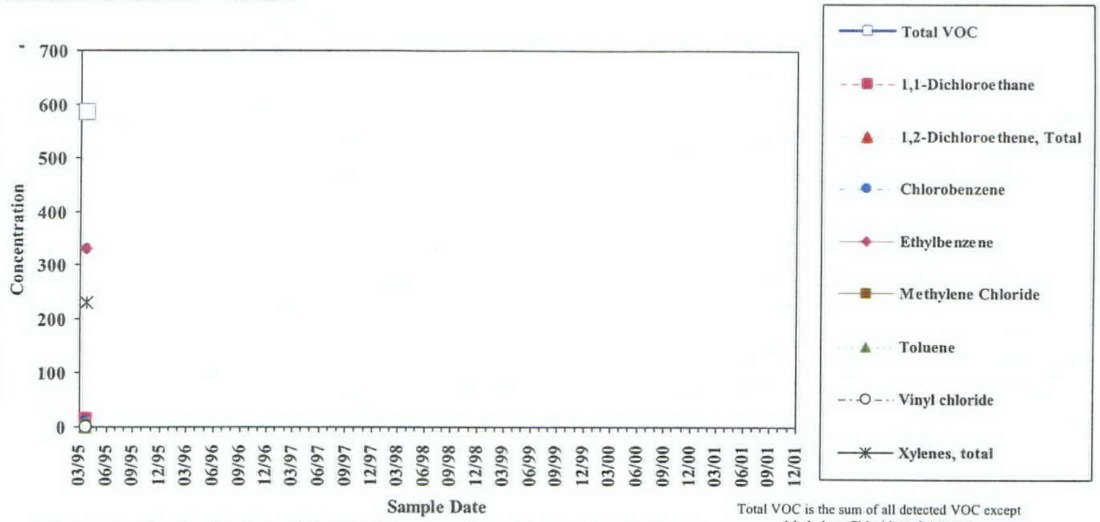
Sample Location:

MW-202B

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

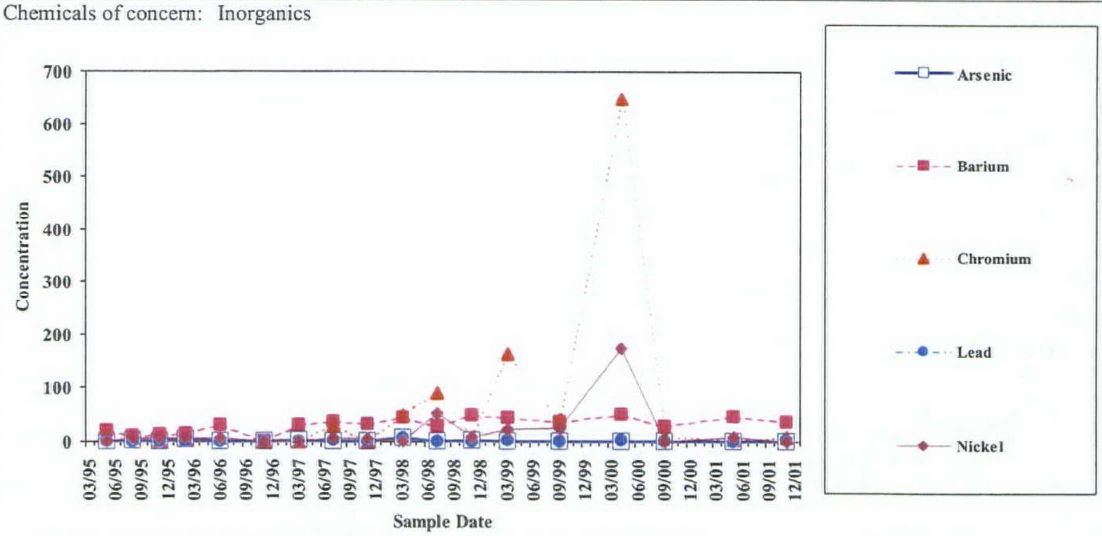
Sample Location:

MW-203

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

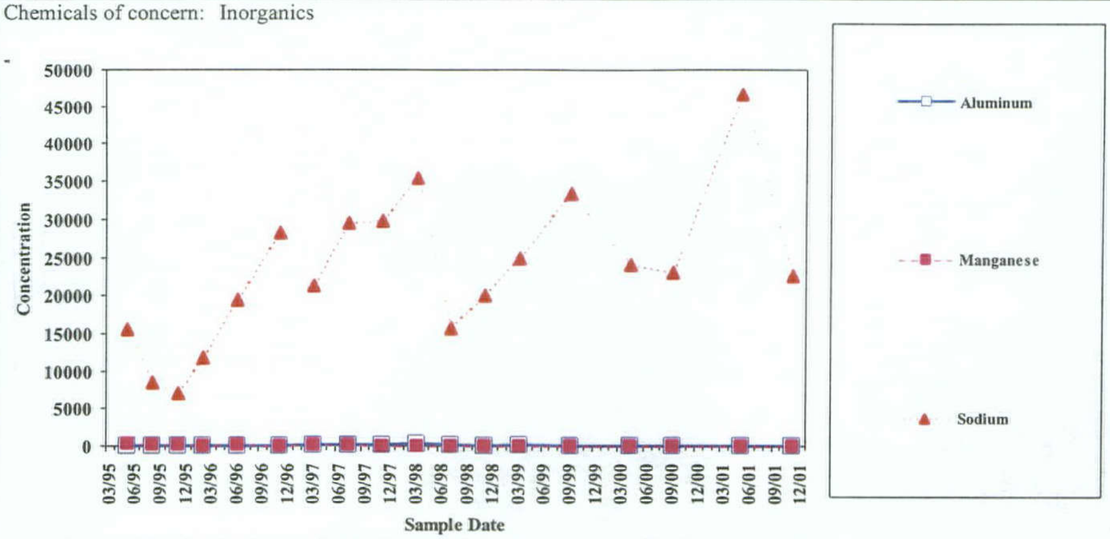
Sample Location:

MW-203

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

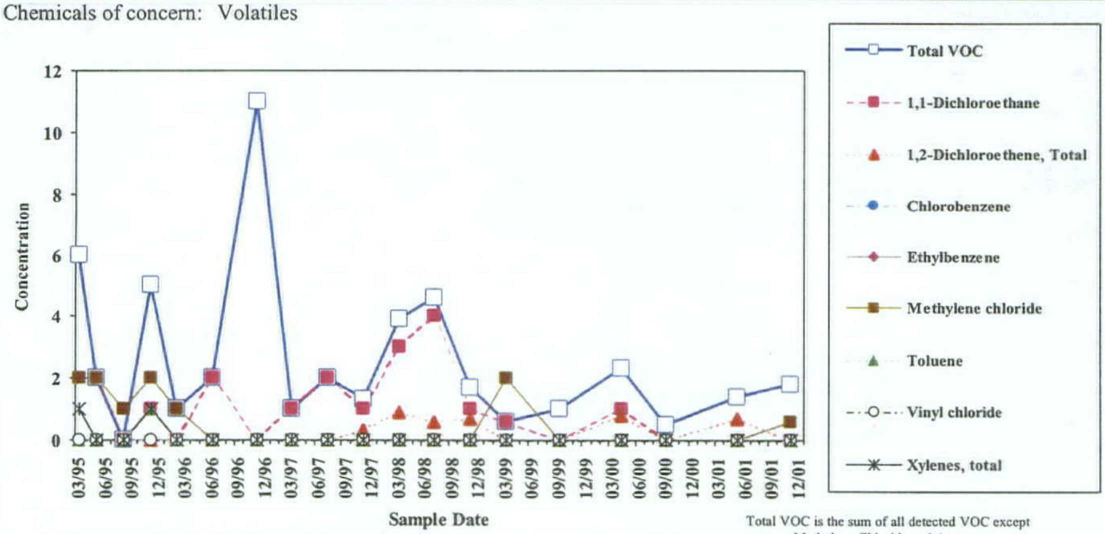
Sample Location:

MW-203

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

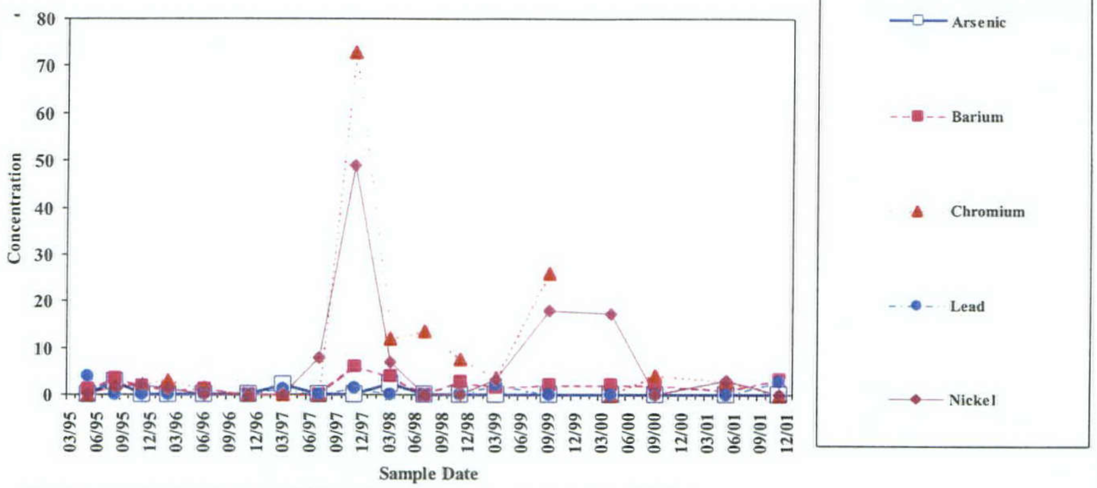
Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:
MW-204

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

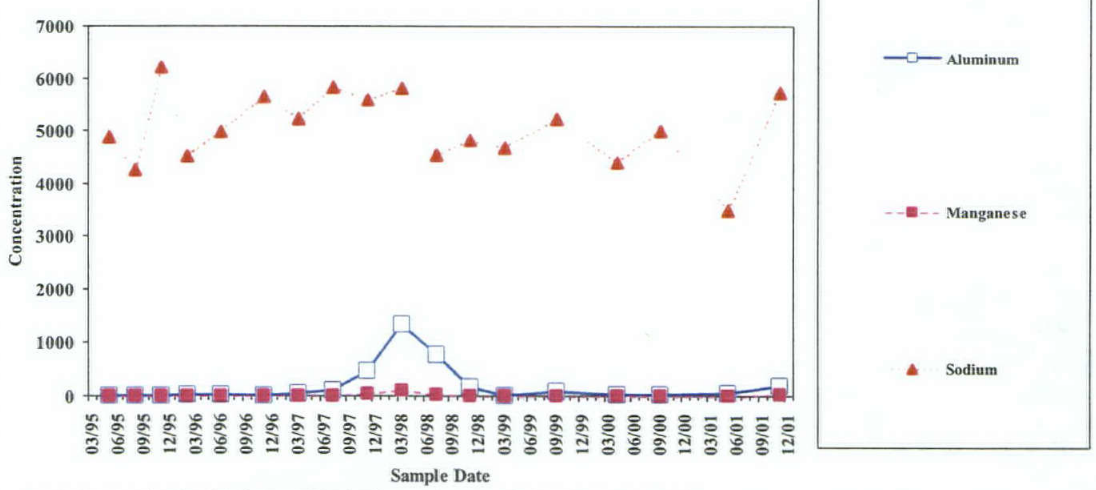
Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:
MW-204

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

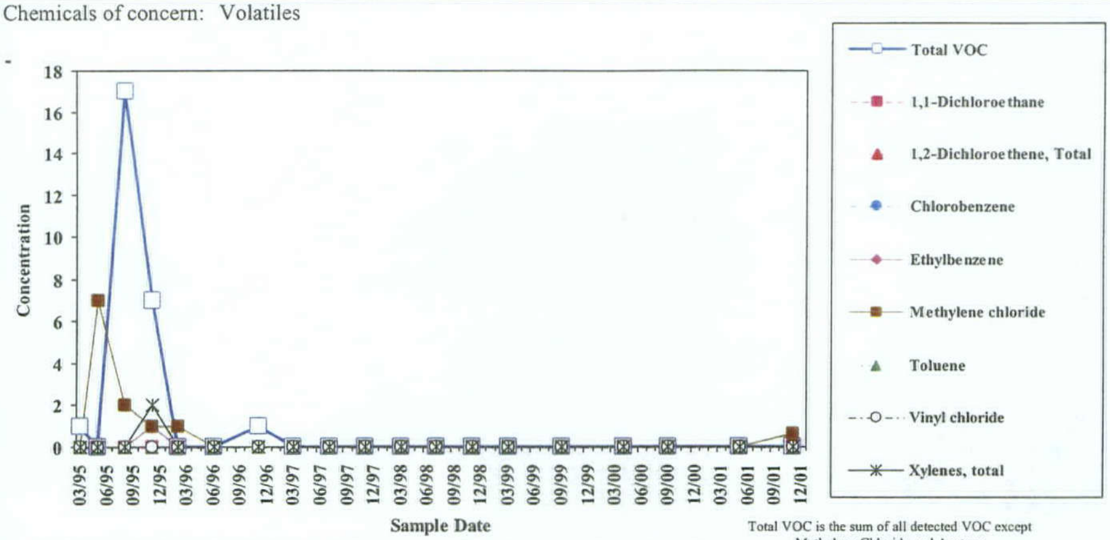
Sample Location:

MW-204

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

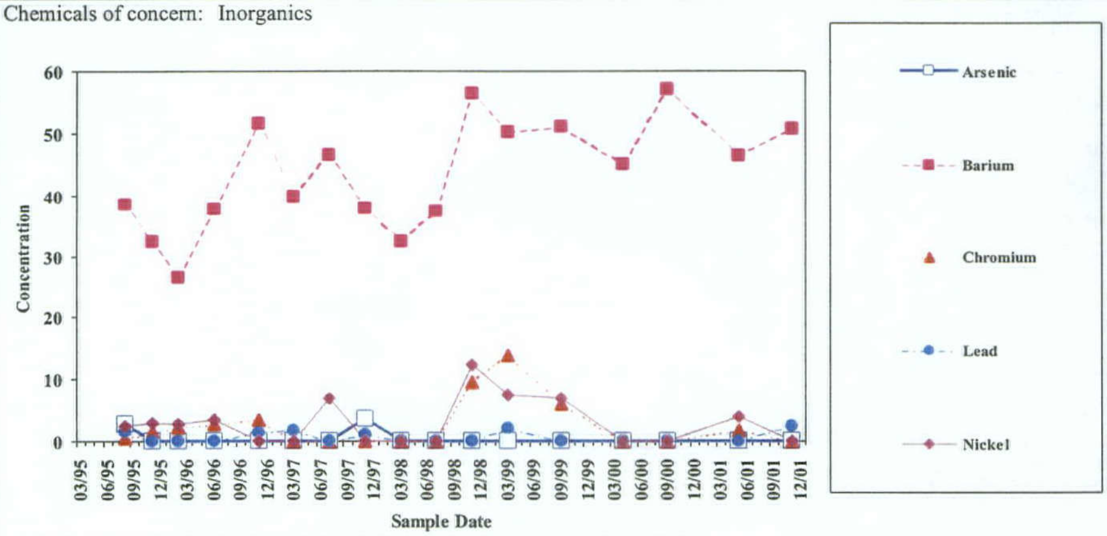
Sample Location:

MW-2101

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

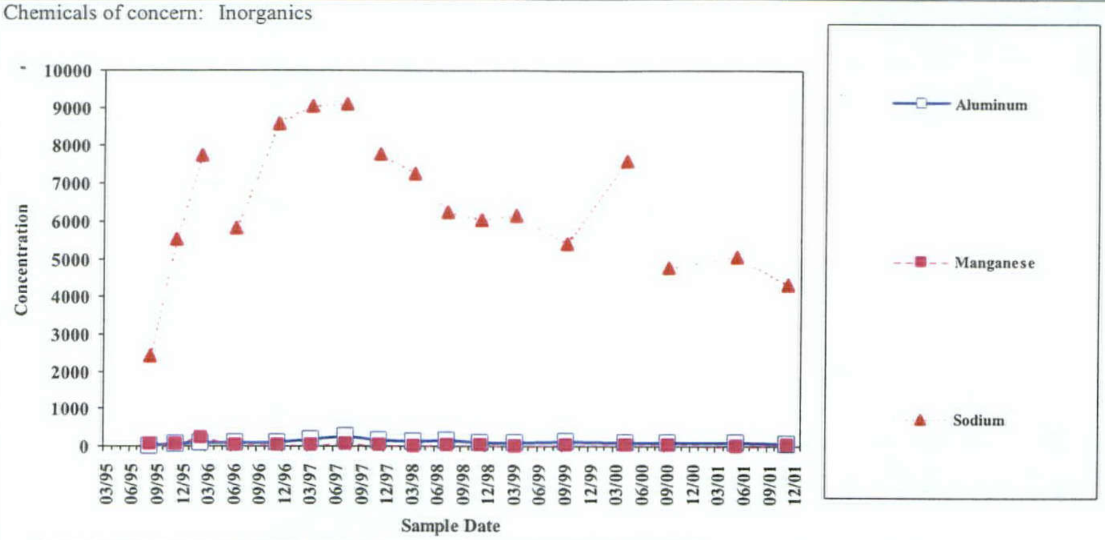
Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:

MW-2101

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

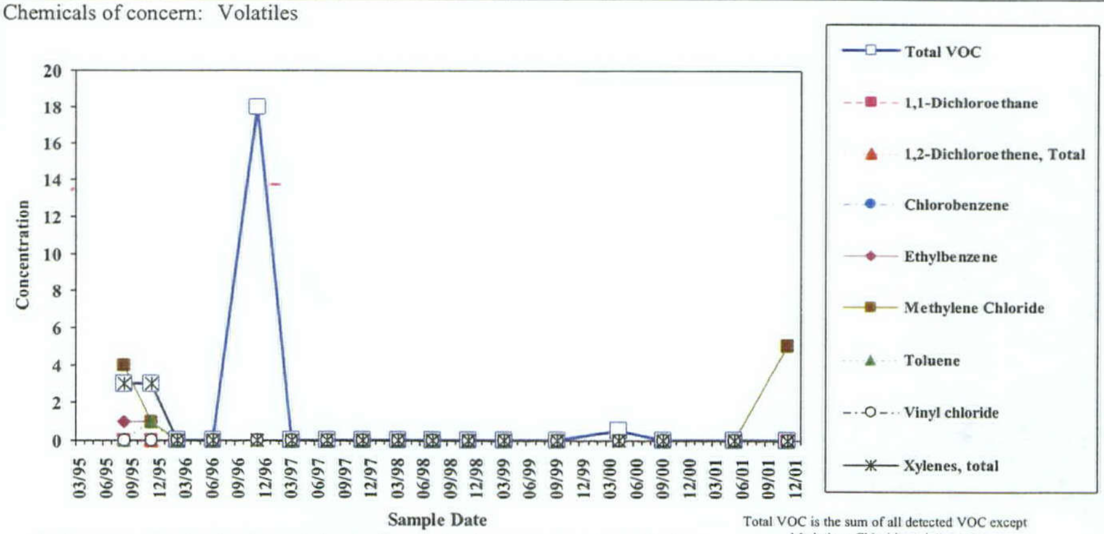
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-2101

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

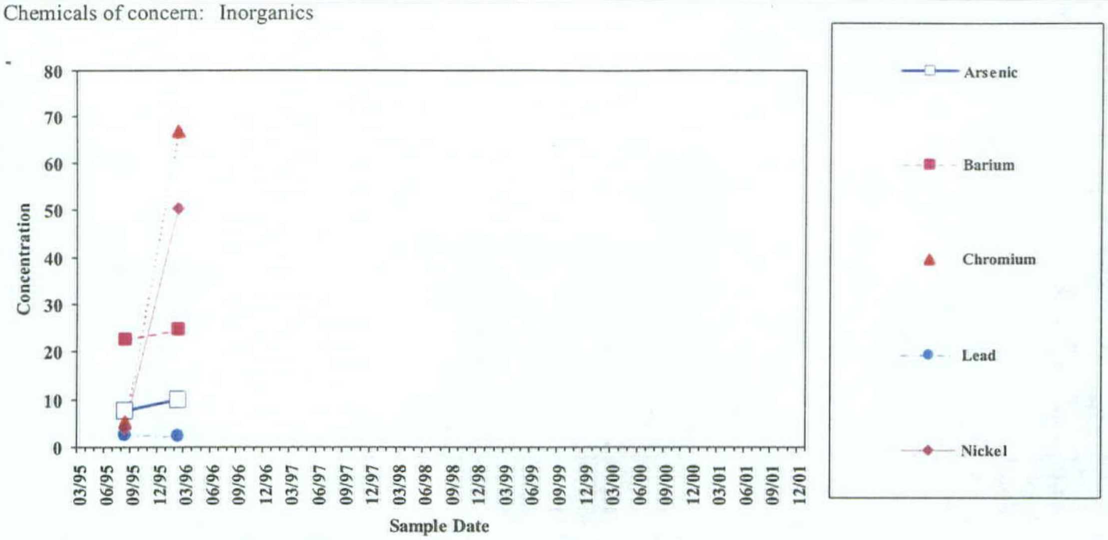
Sample Location:

MW-210A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

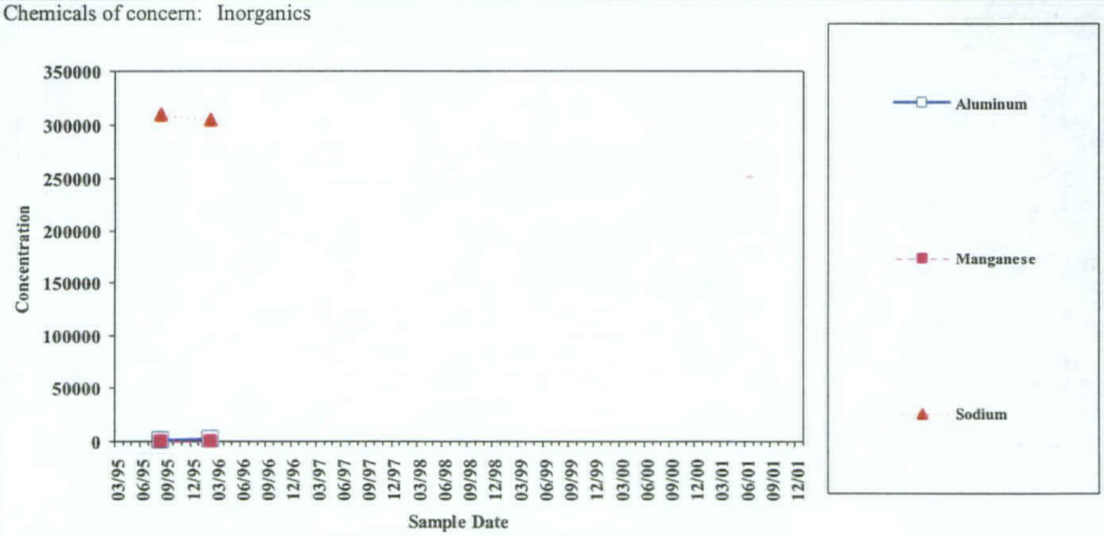
Sample Location:

MW-210A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

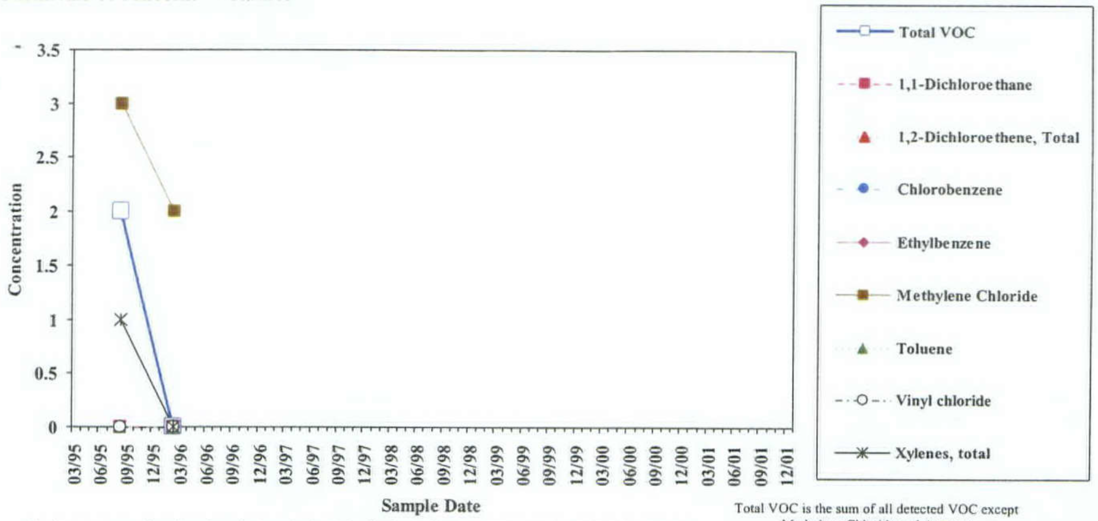
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location: Sites 1 & 3

MW-210A

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

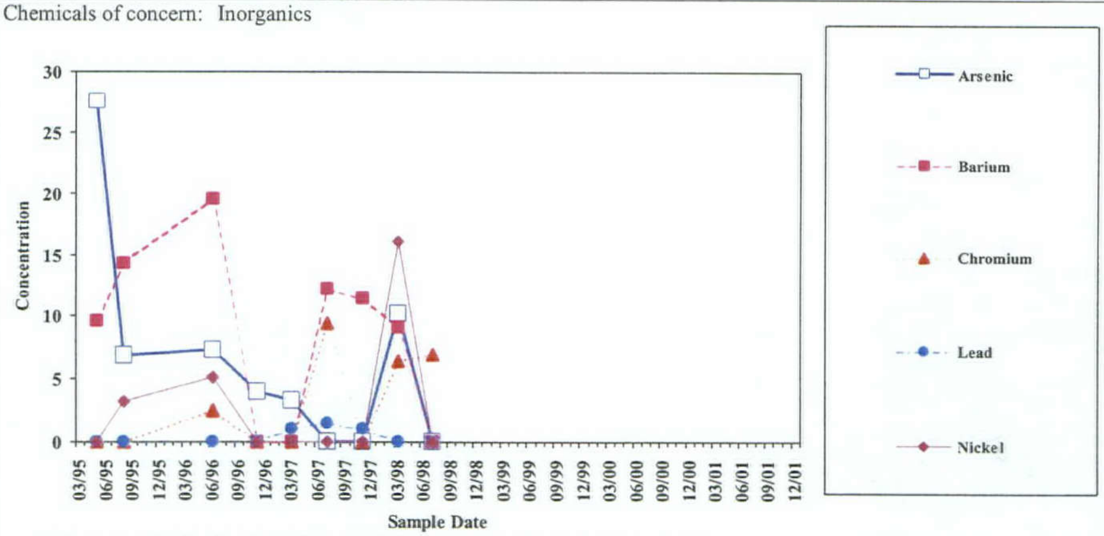
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location: Sites 1 & 3

MW-210B

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

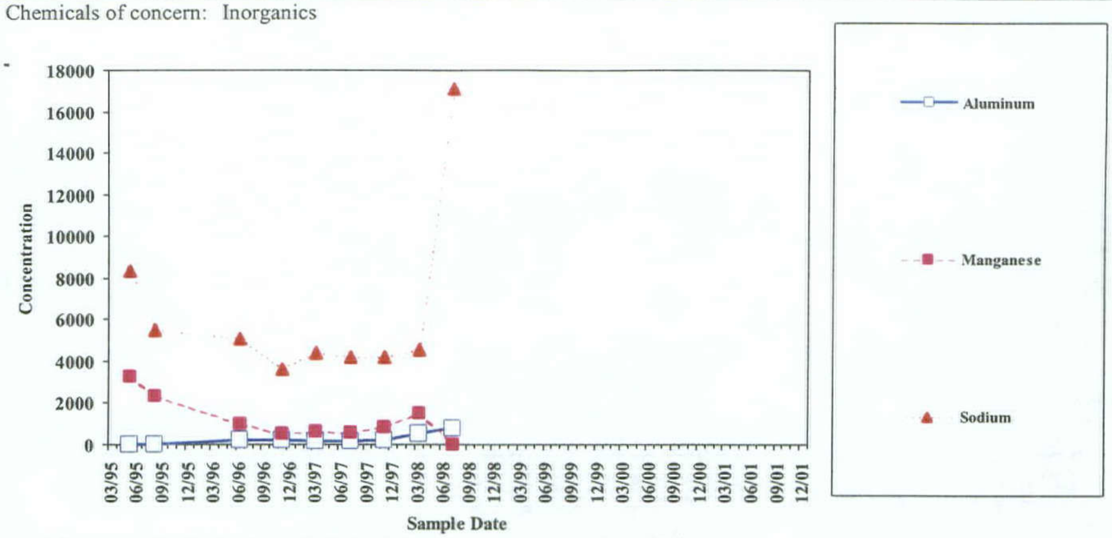
Sample Location:

MW-210B

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

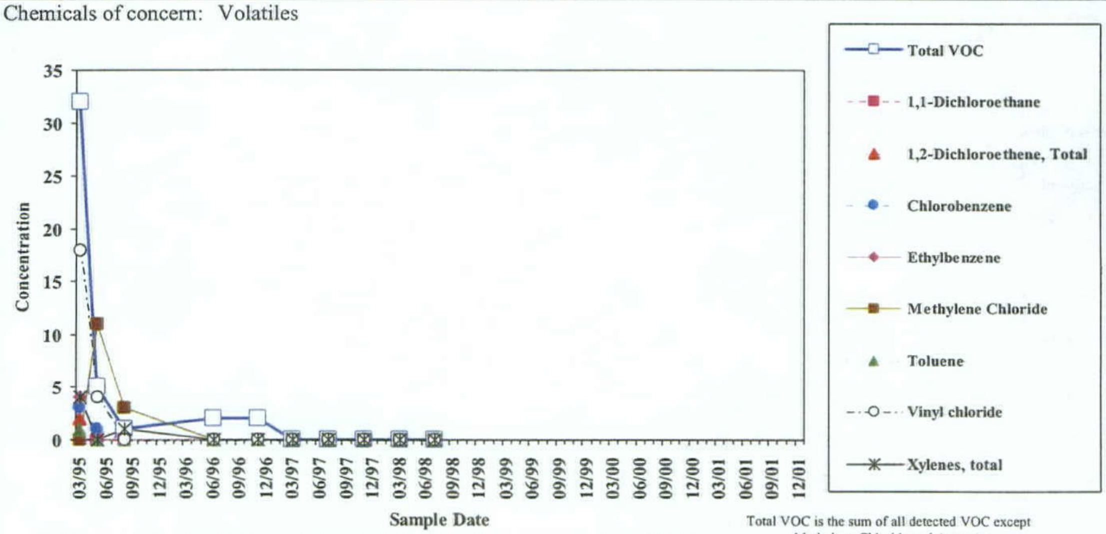
Sample Location:

MW-210B

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

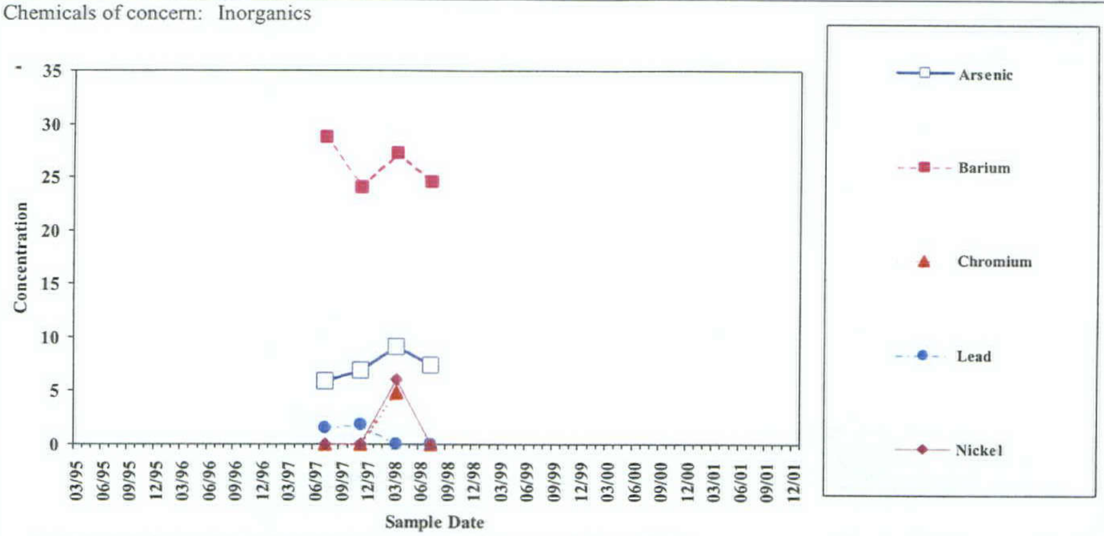
Sample Location:

MW-210R

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

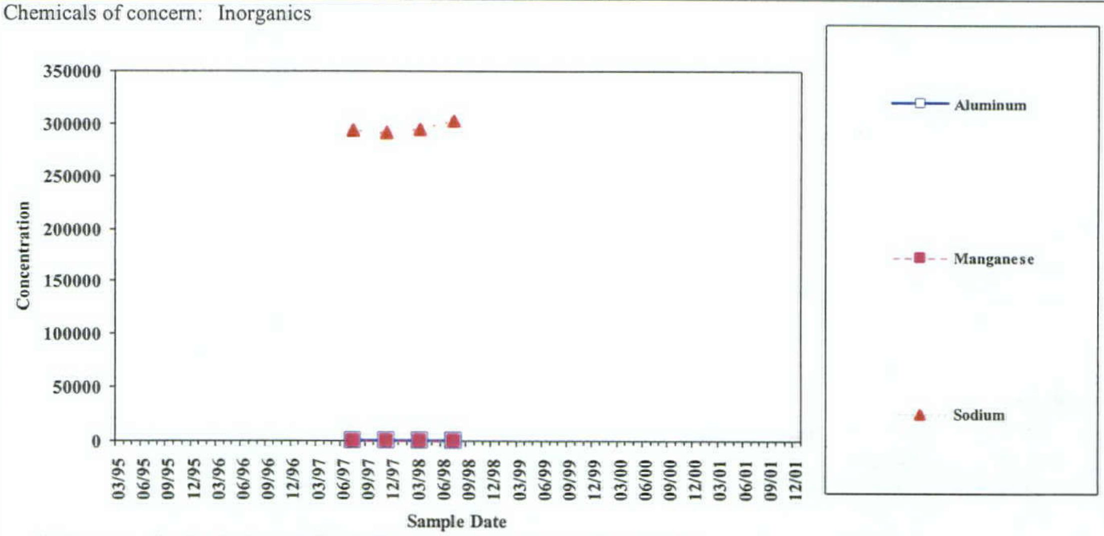
Sample Location:

MW-210R

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

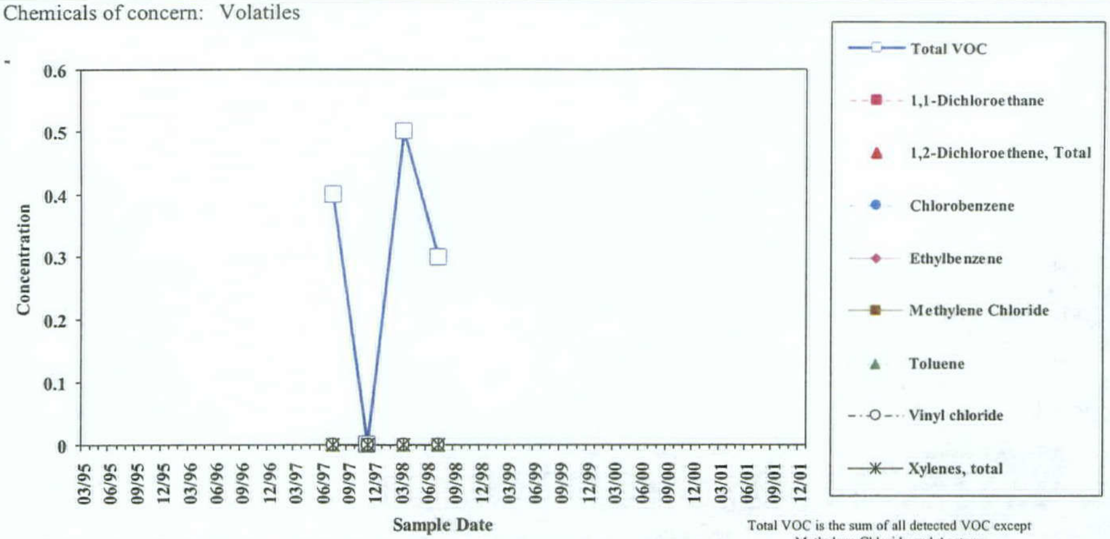
Sample Location:

MW-210R

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

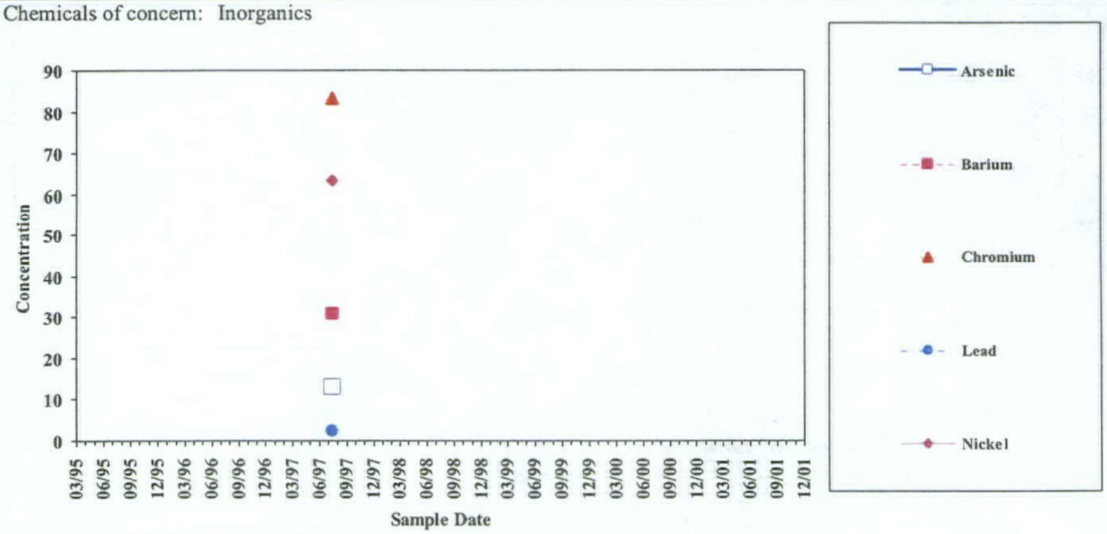
Sample Location:

MW-211B

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

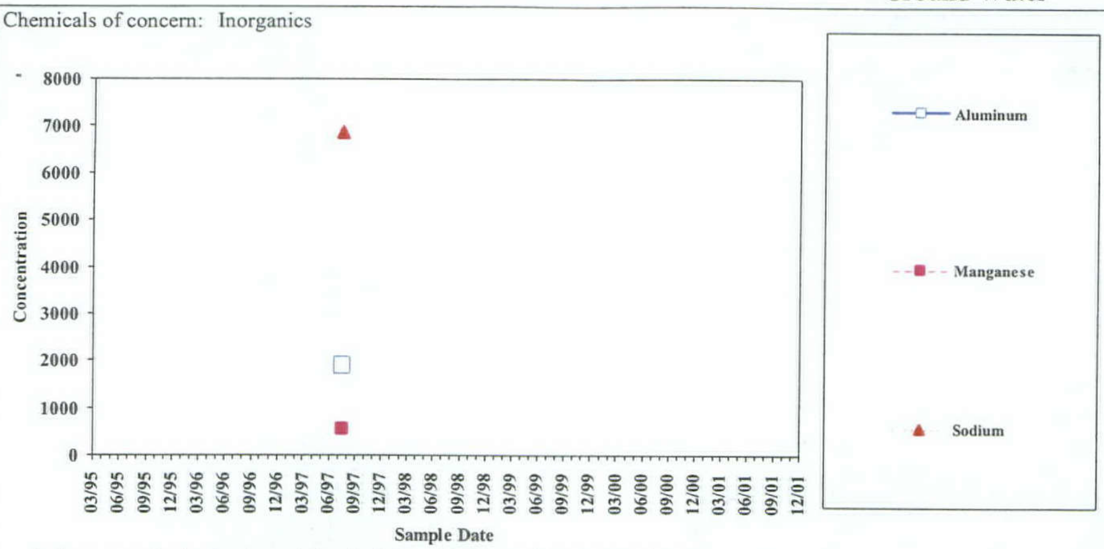
Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:

MW-211B

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

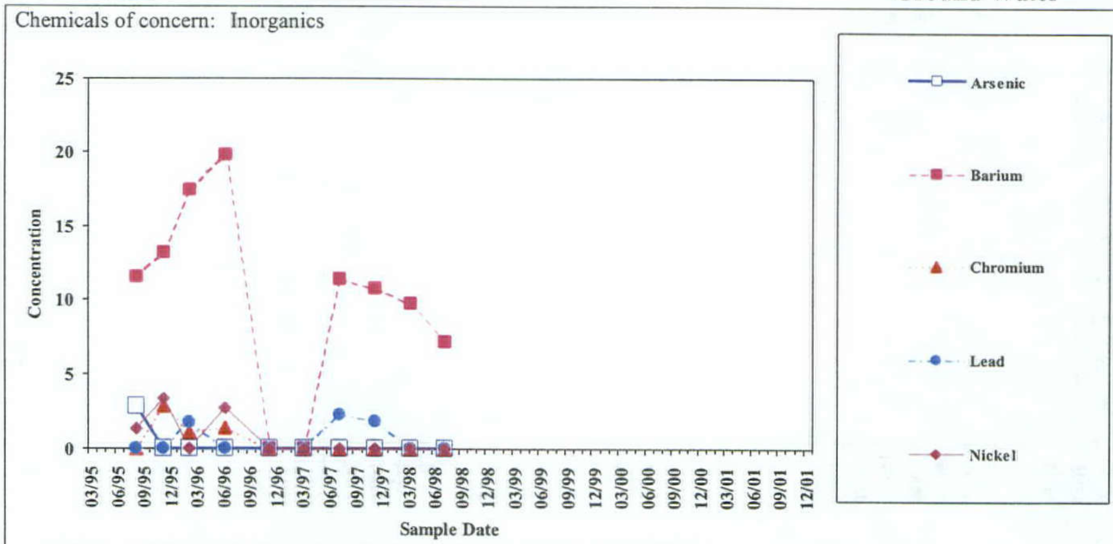
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-215R

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

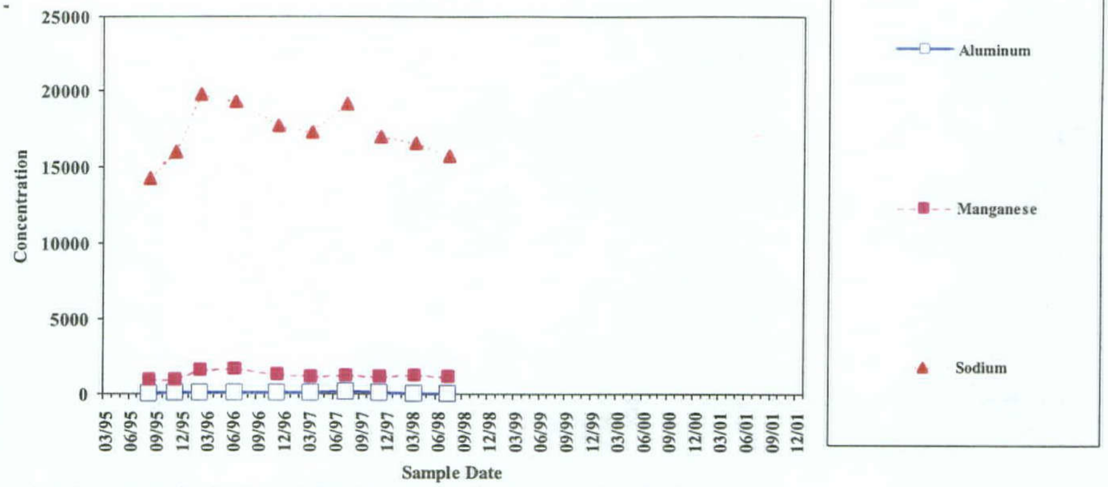
Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:

MW-215R

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

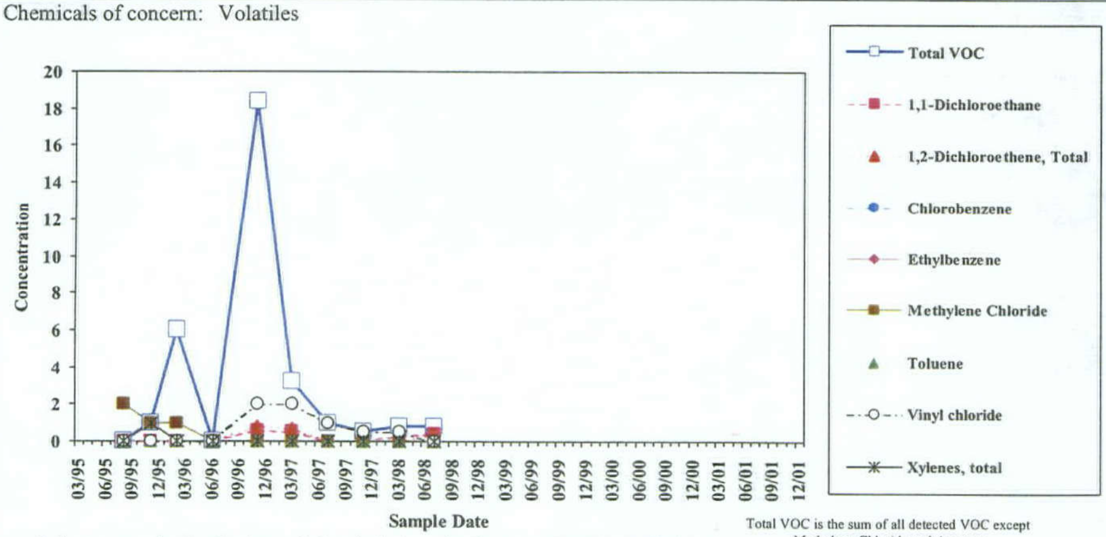
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-215R

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

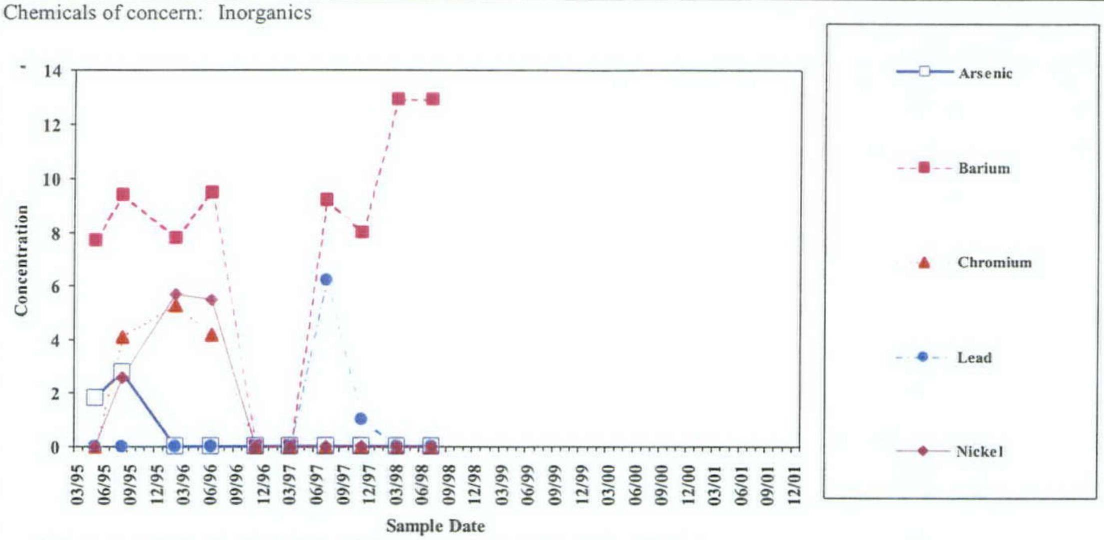
Sample Location:

MW-216A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

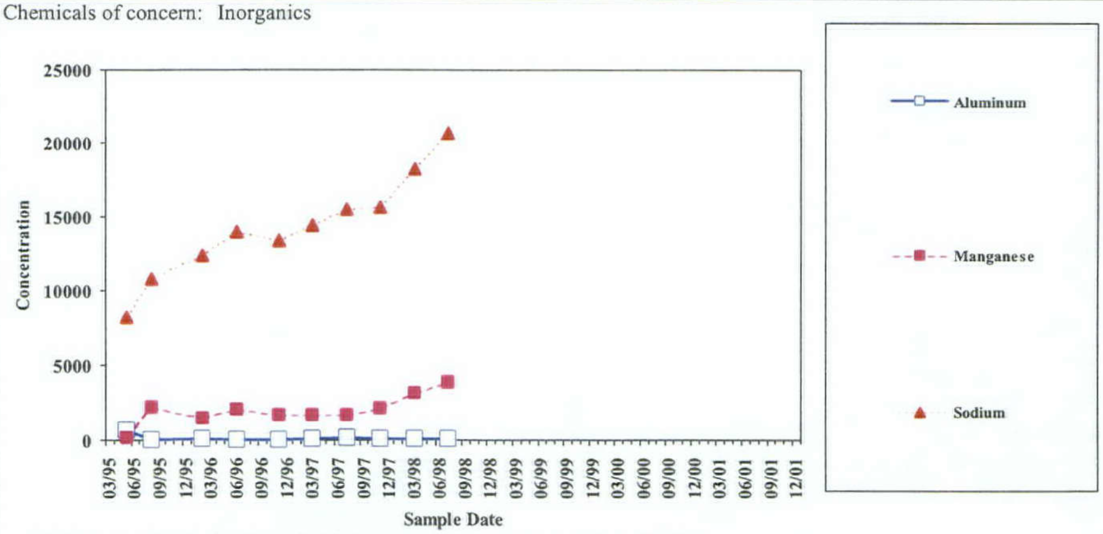
Sample Location:

MW-216A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

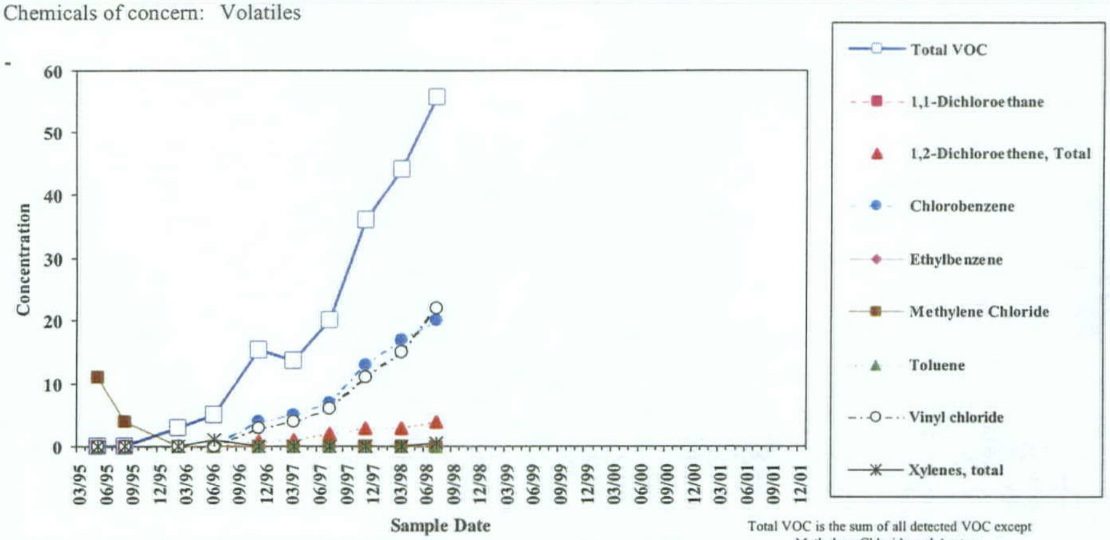
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-216A

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

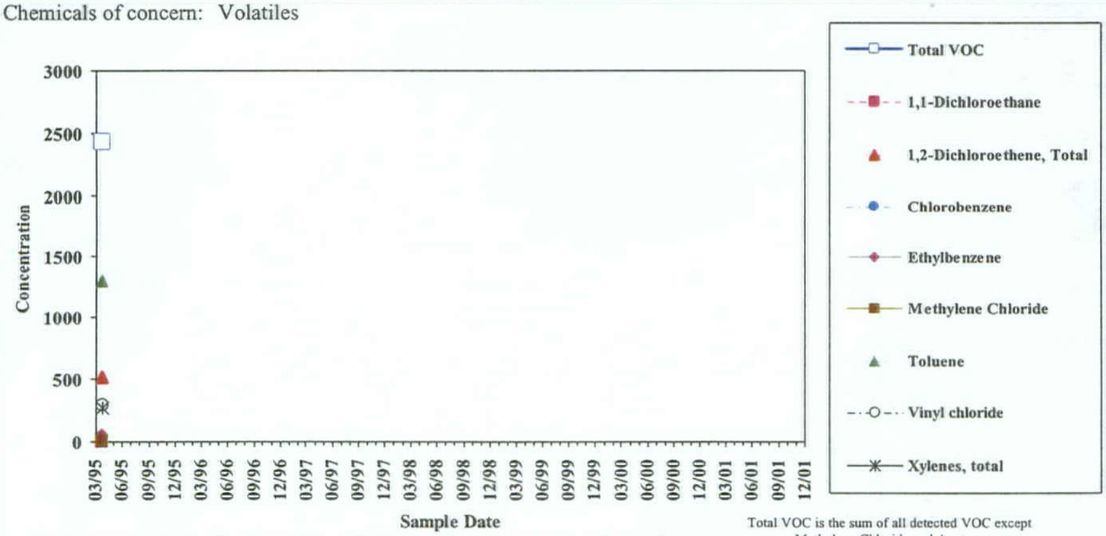
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:

MW-216B

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

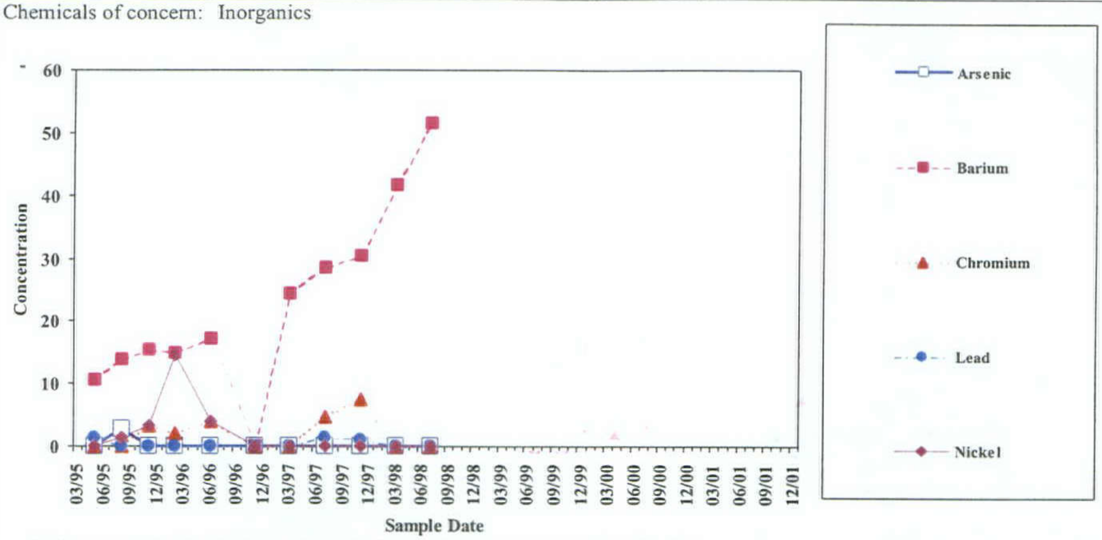
Sample Location:

MW-217A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

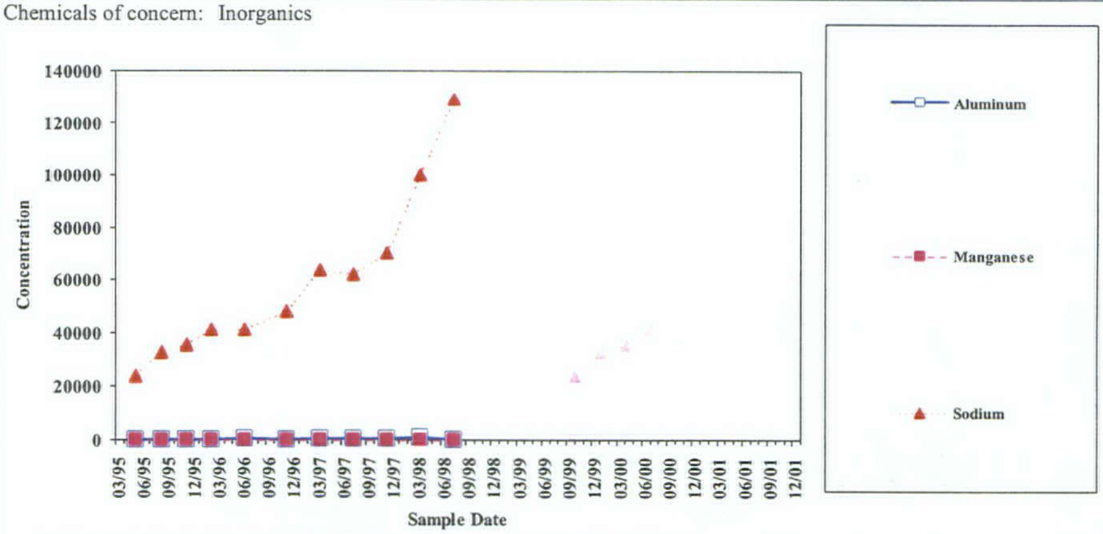
Sample Location:

MW-217A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

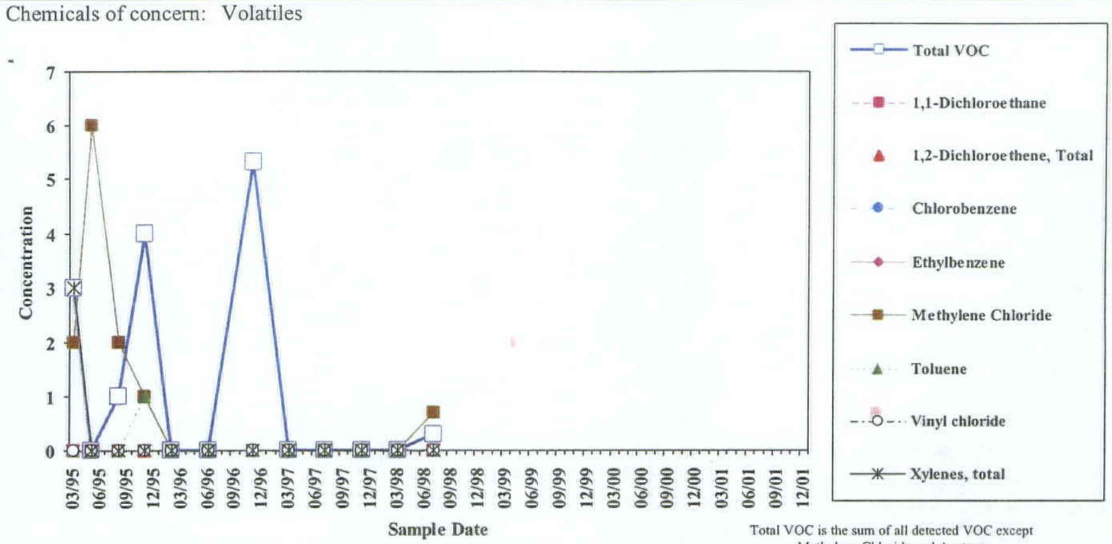
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-217A

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

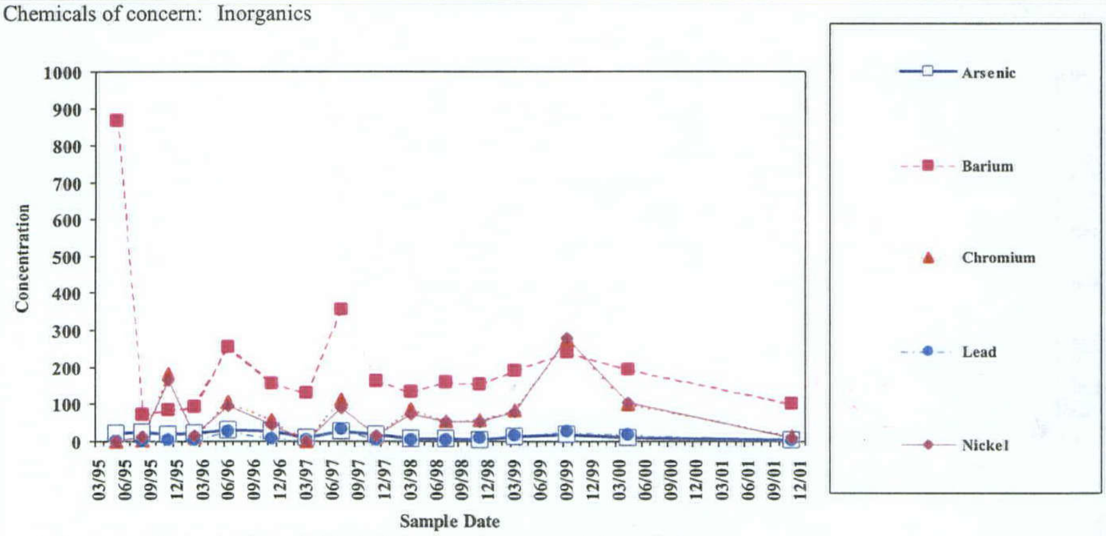
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:

MW-217B

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

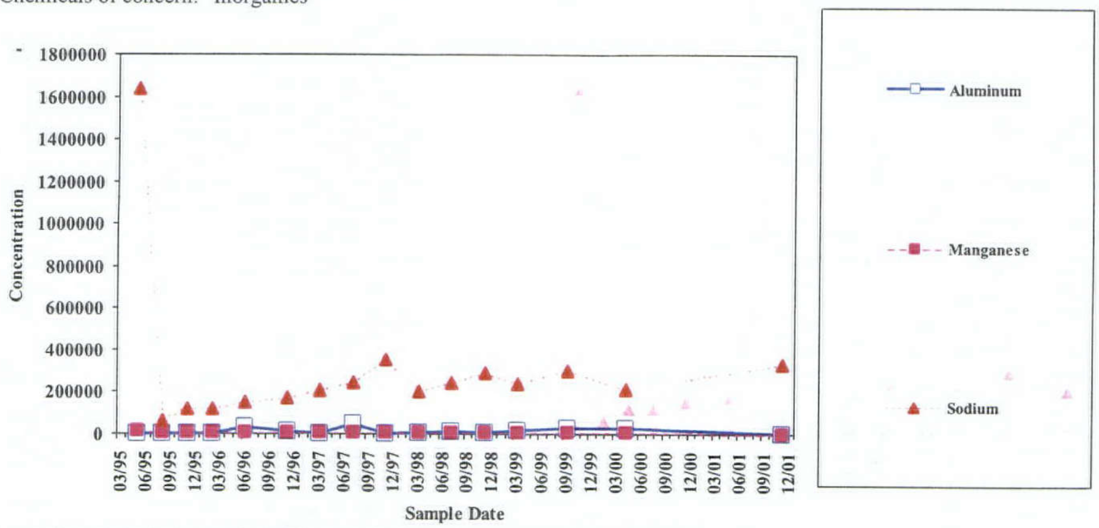
Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:

MW-217B

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

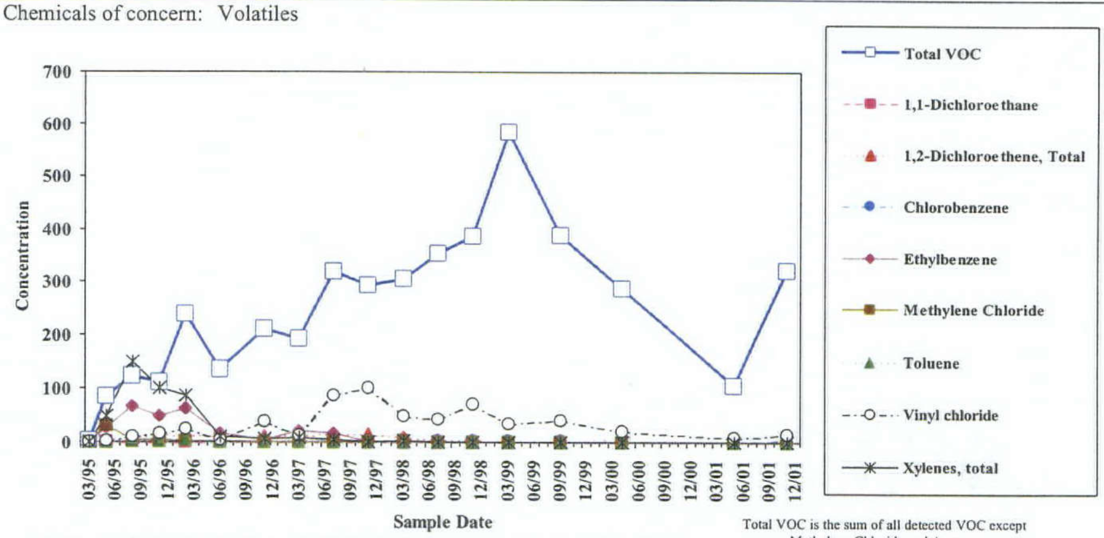
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-217B

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

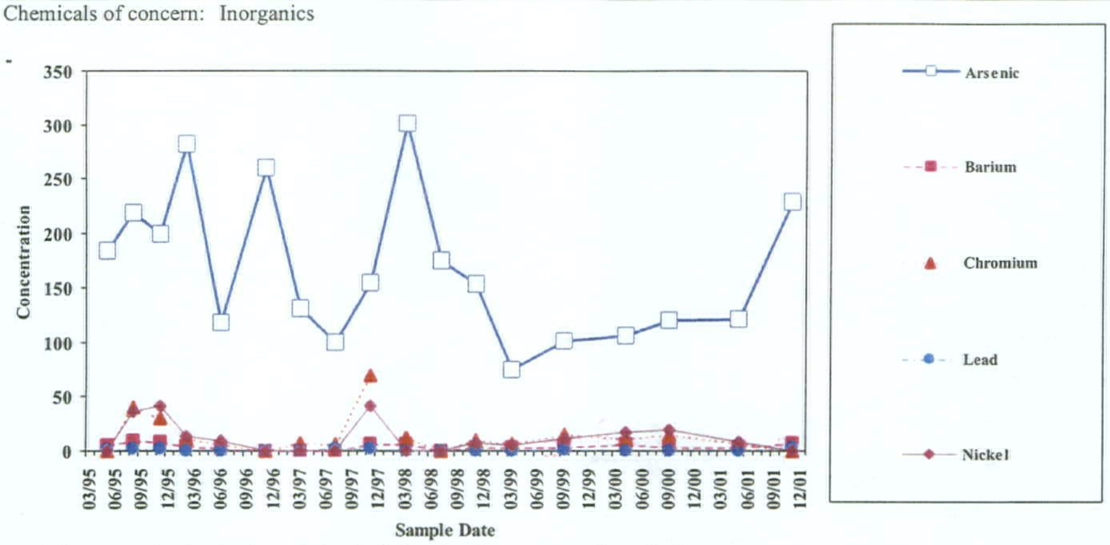
Sample Location:

MW-218

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

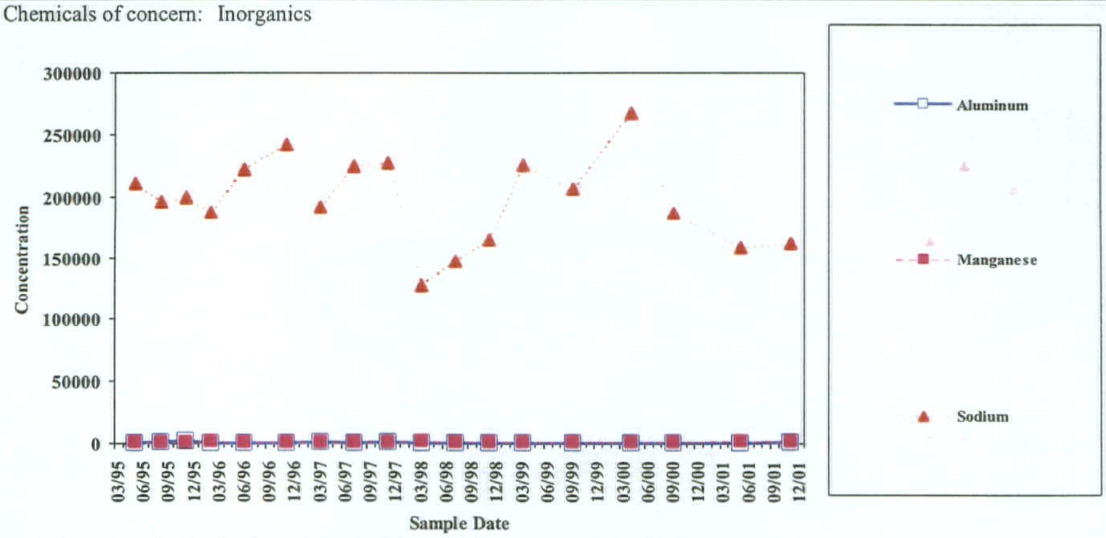
Sample Location:

MW-218

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

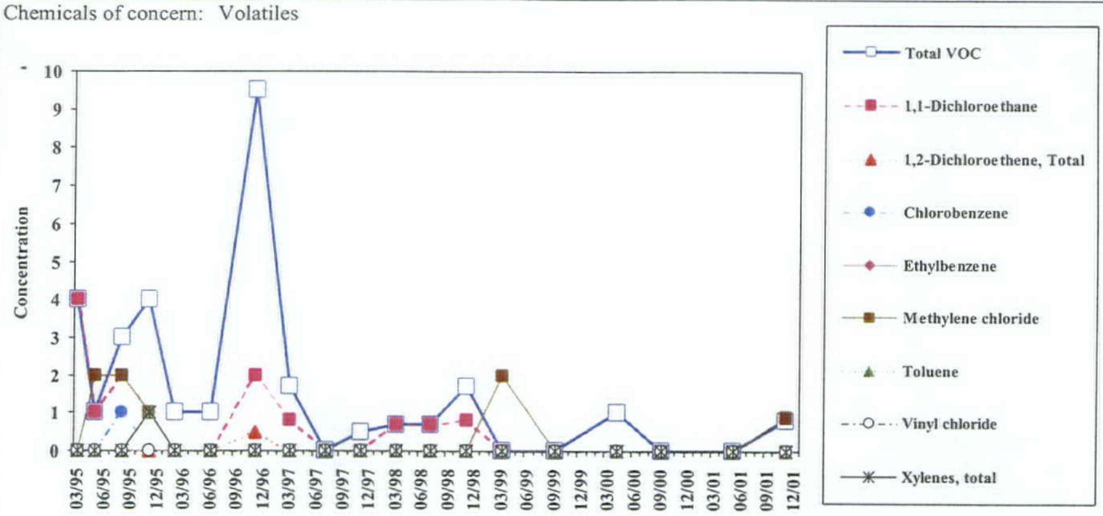
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-218

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

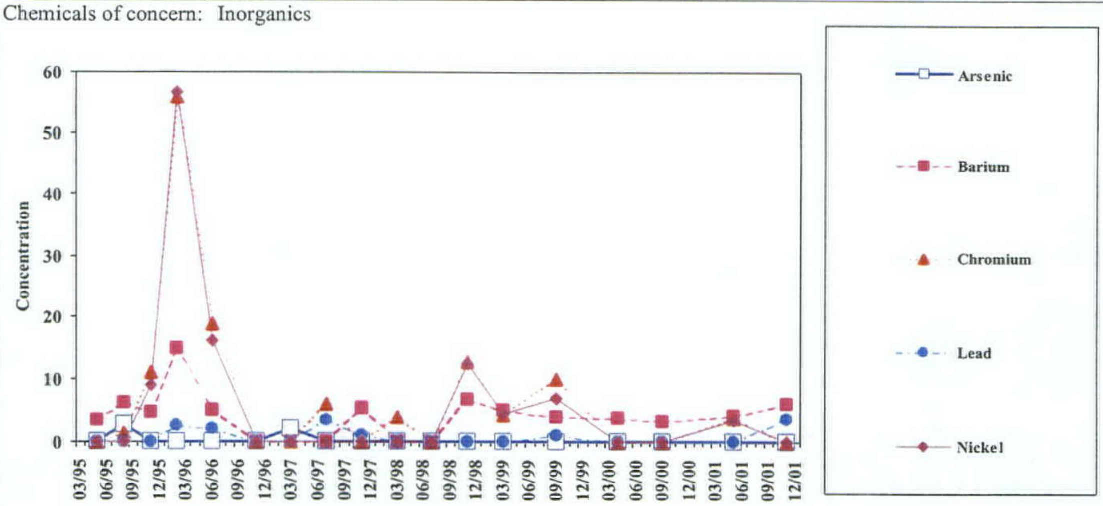
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:

MW-219

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

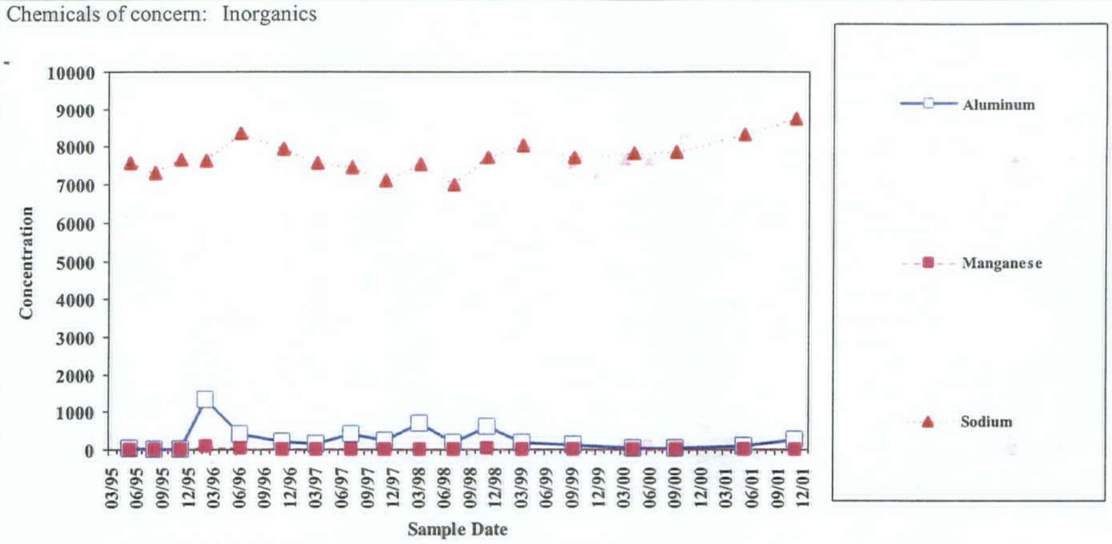
Sample Location:

MW-219

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: μg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

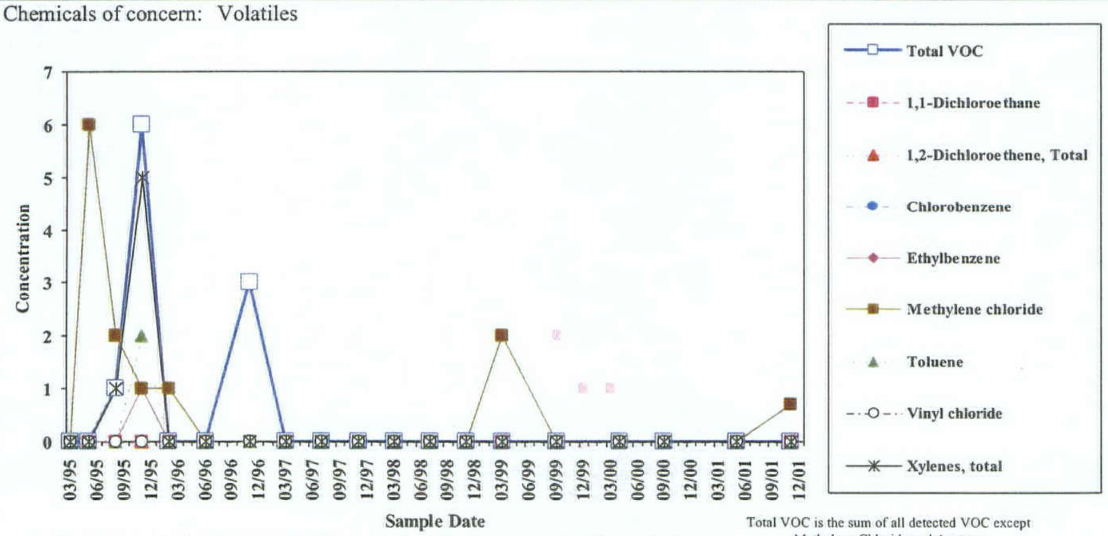
Sample Location:

MW-219

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: μg/L

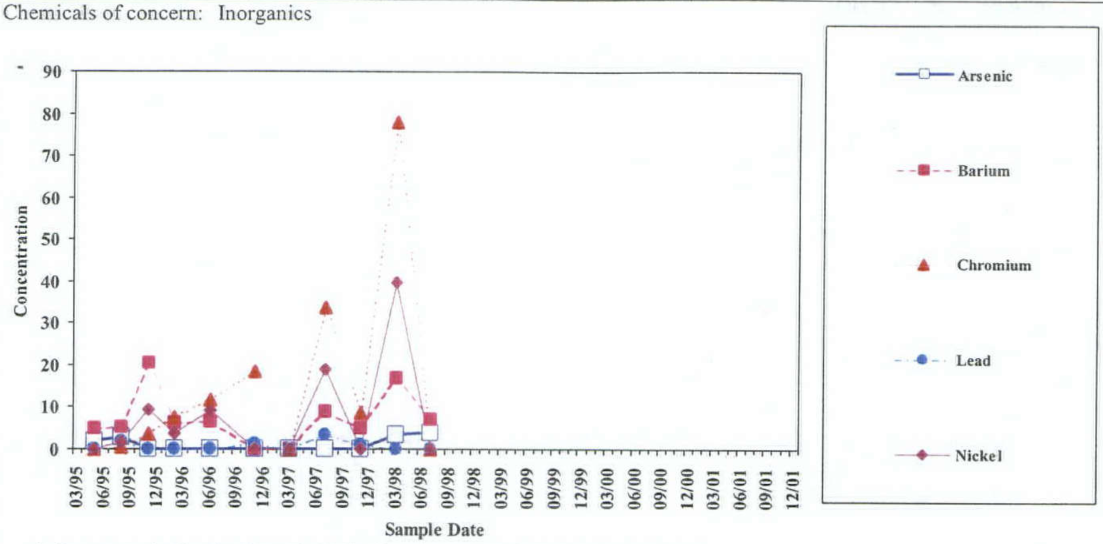
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:

MW-220

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

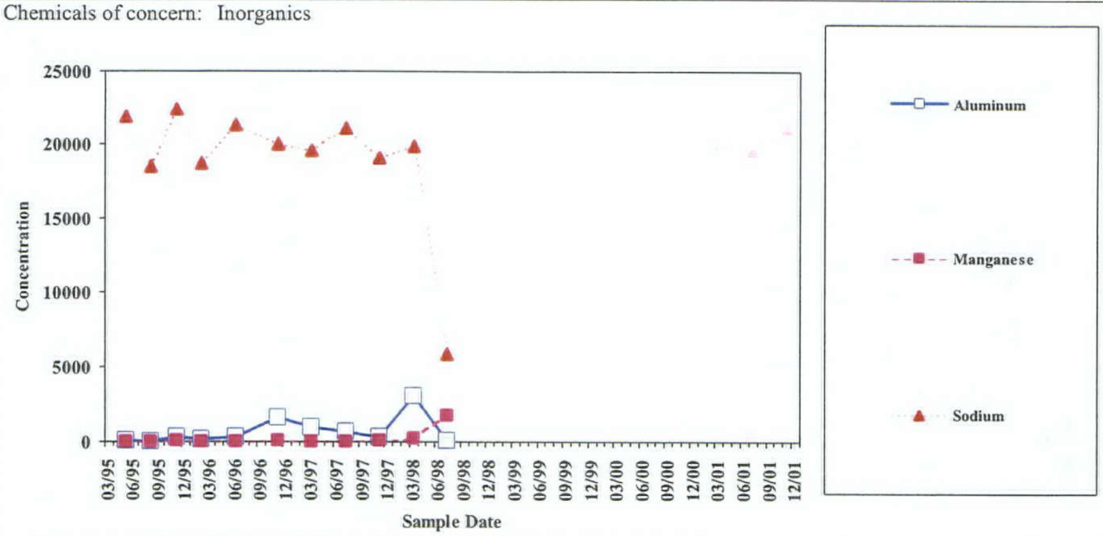
Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:

MW-220

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

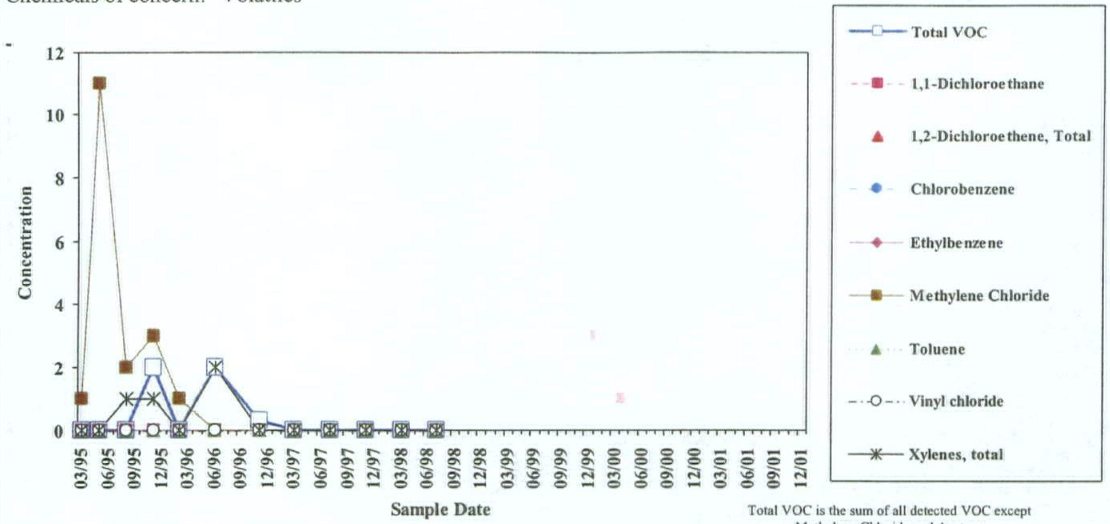
Sample Location:

MW-220

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Figure 73 of 171

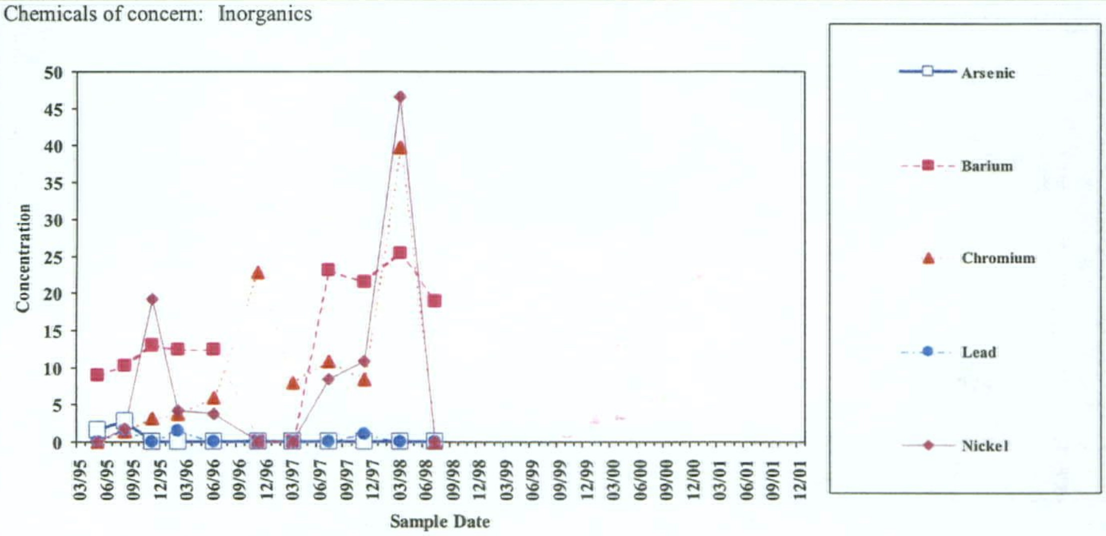
Sample Location:

MW-232A

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

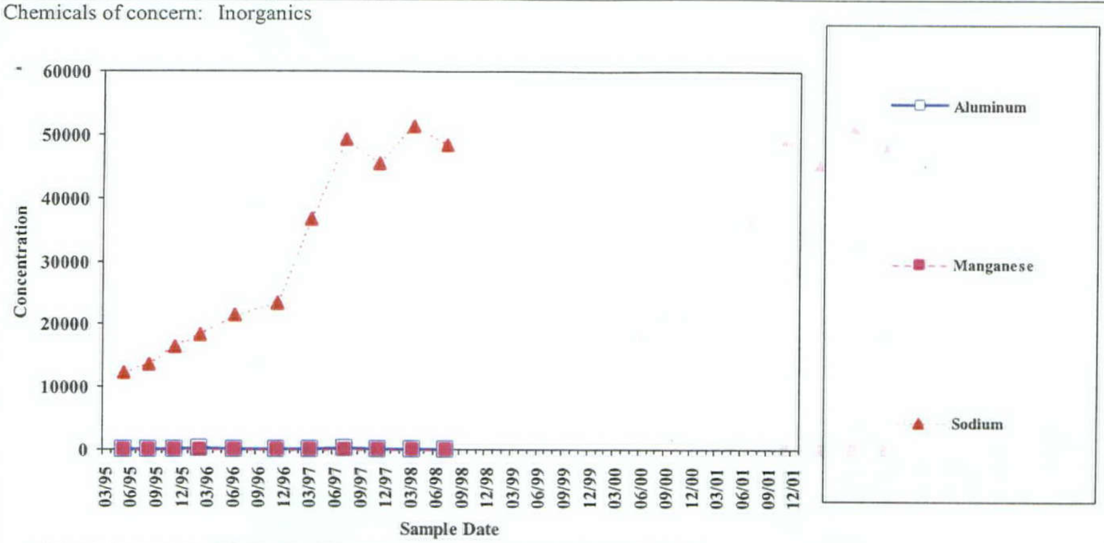
Figure 74 of 171

Sample Location:

MW-232A

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

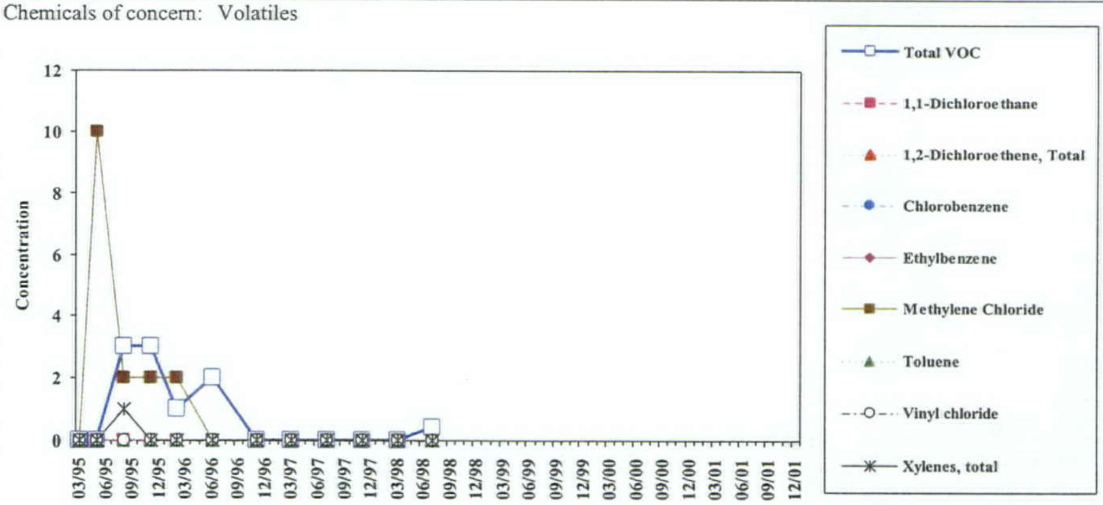
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

MW-232A

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

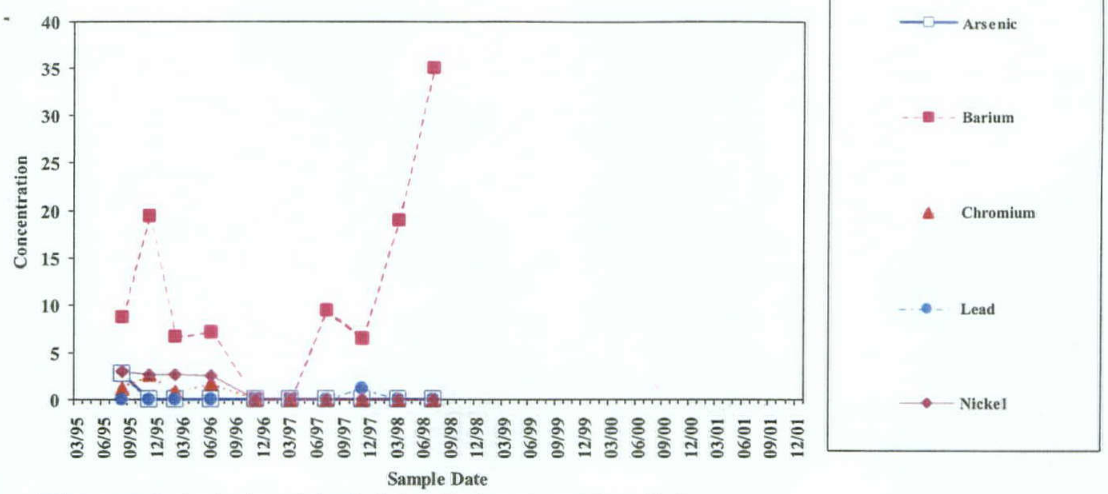
Sample Location:

MW-234R

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

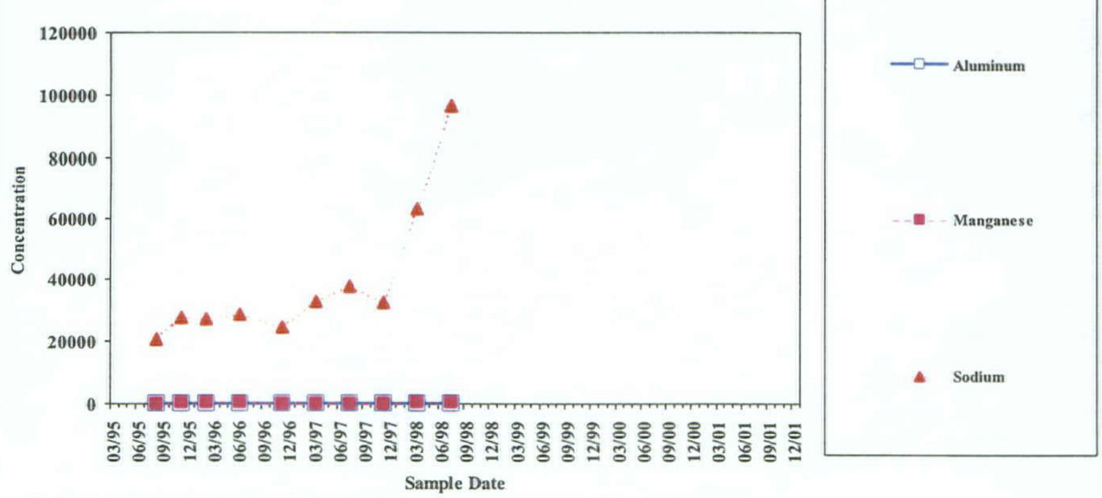
Sample Location:

MW-234R

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

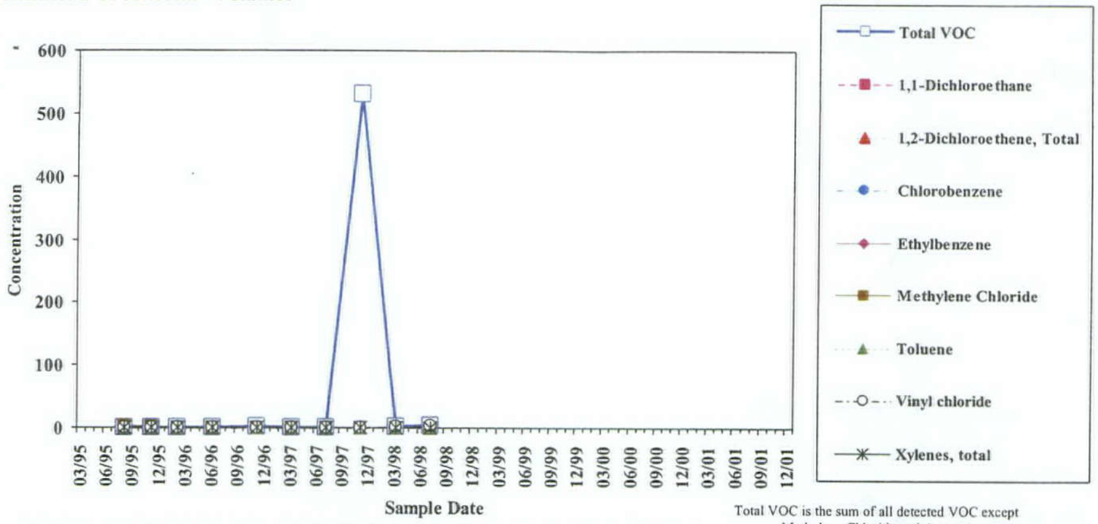
Sample Location:

MW-234R

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: μg/L

1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

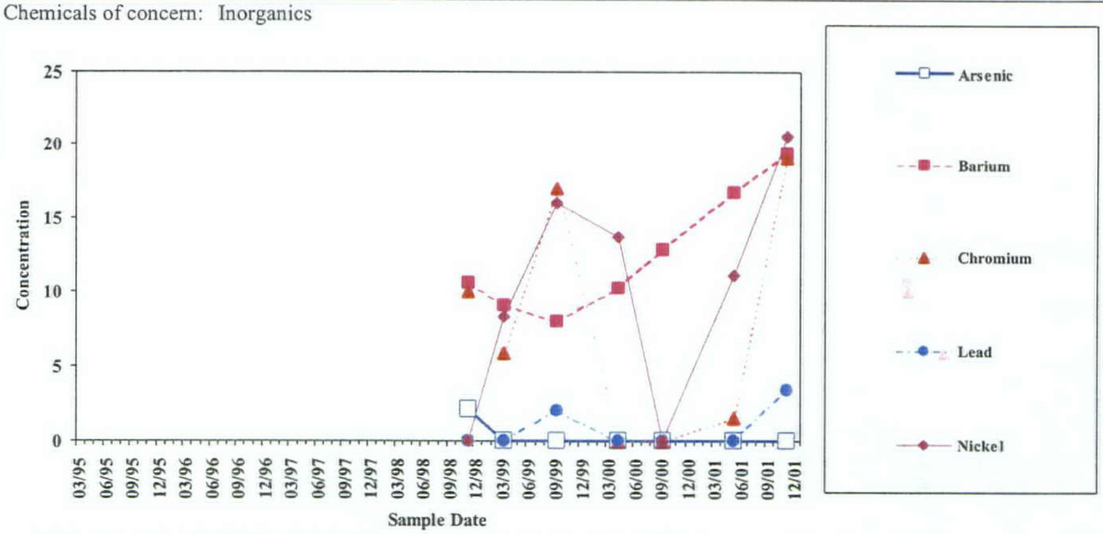
Sample Location:

MW-240

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: μg/L

Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

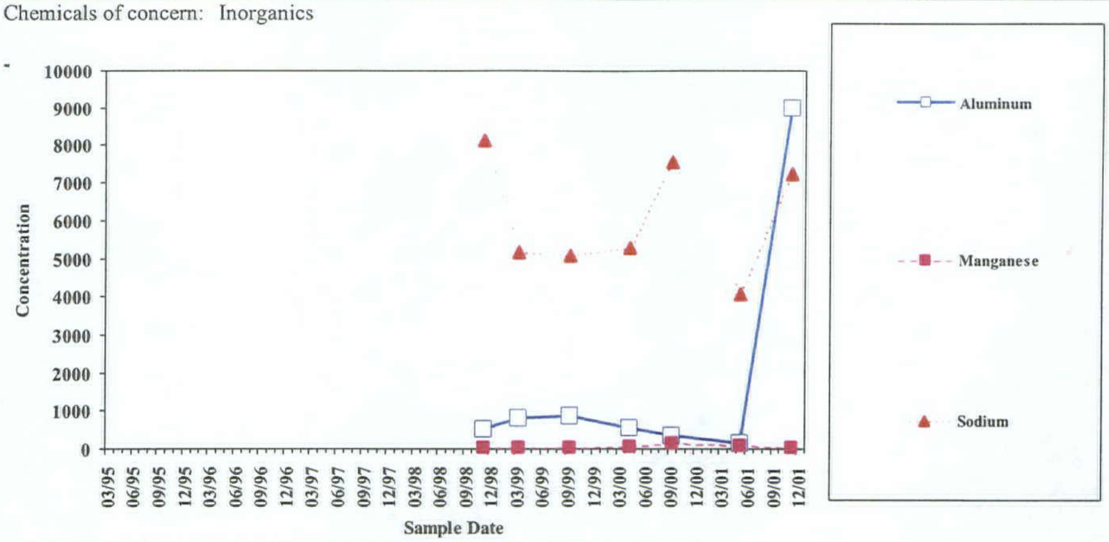
Sample Location:

MW-240

Sites 1 & 3

Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

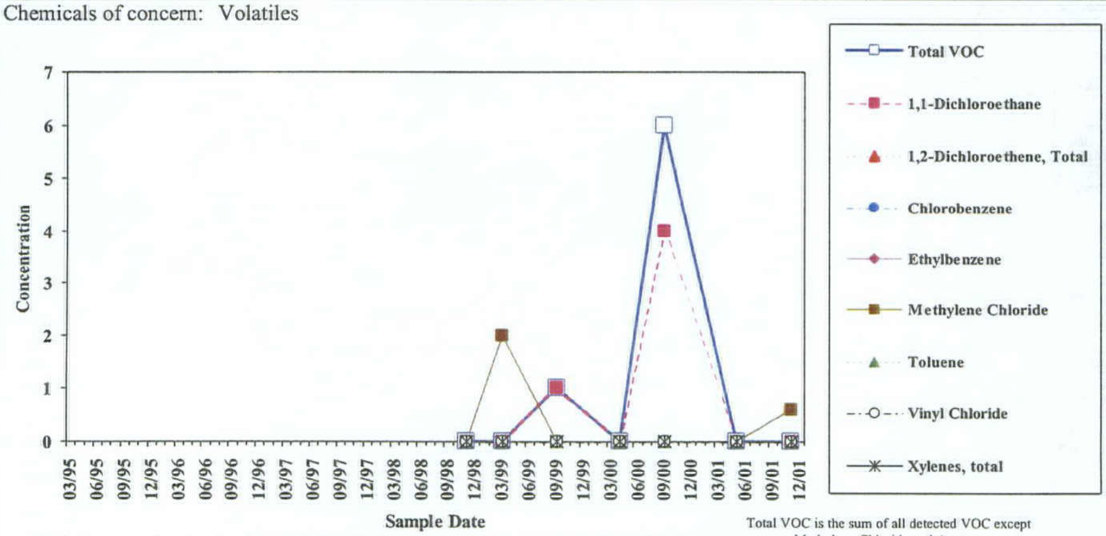
Sample Location:

MW-240

Sites 1 & 3

Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

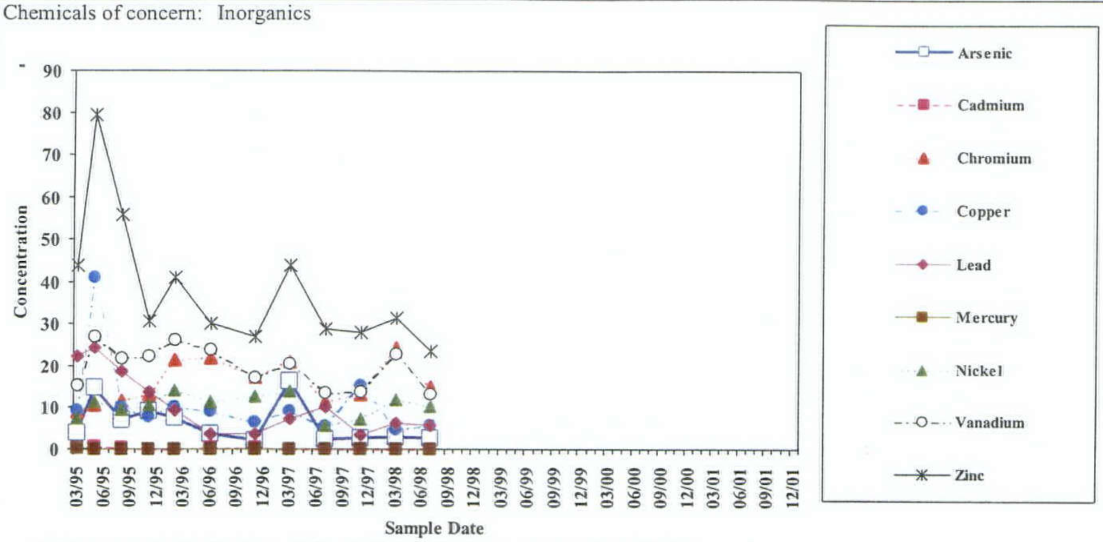
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:

SED-01

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

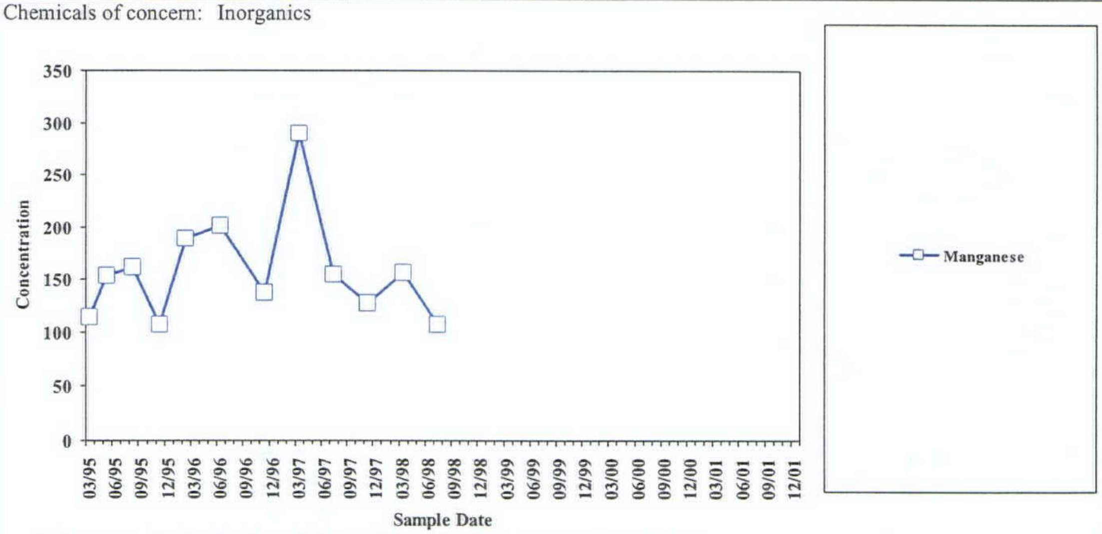
Sample concentration units: mg/Kg

Sample Location:

SED-01

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

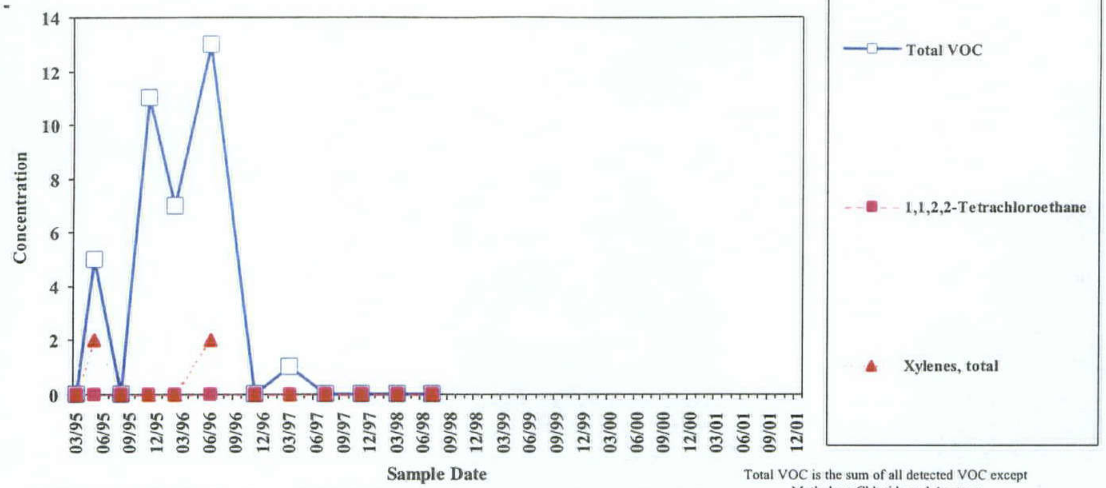
Sample Location:

SED-01

Sites 1 & 3

Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: μg/Kg

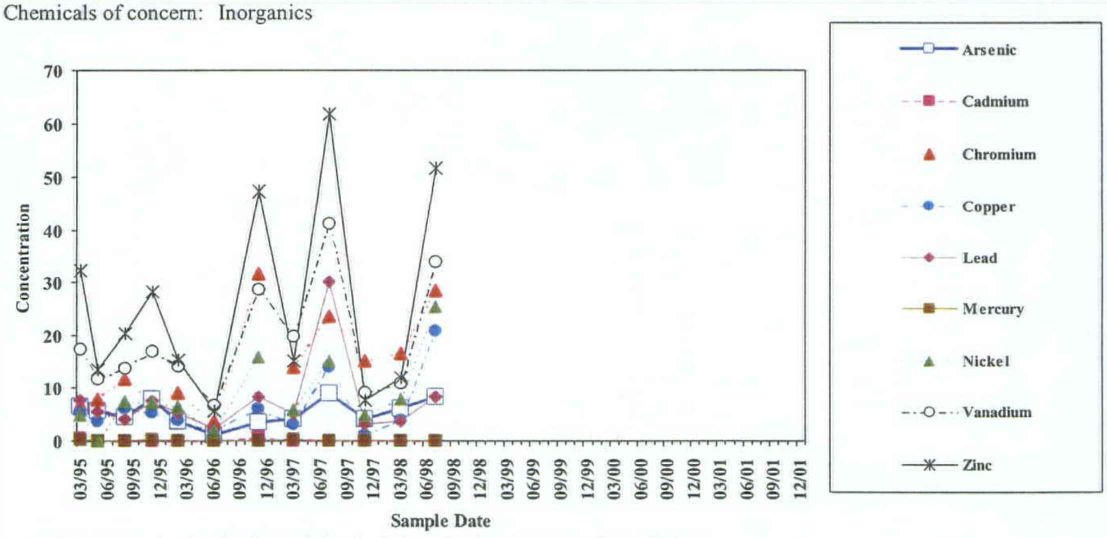
Sample Location:

SED-02

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

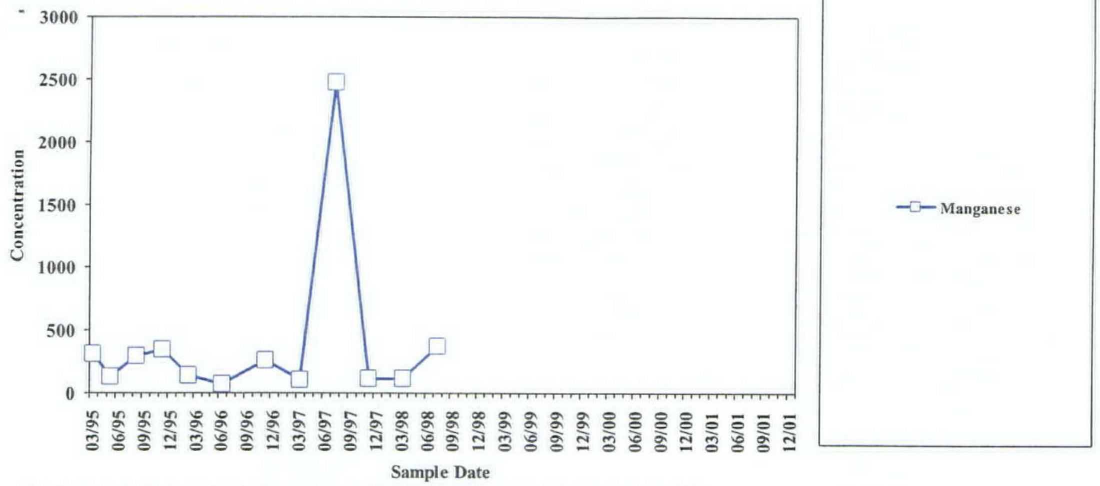
Sample concentration units: mg/Kg

Sample Location:

SED-02

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

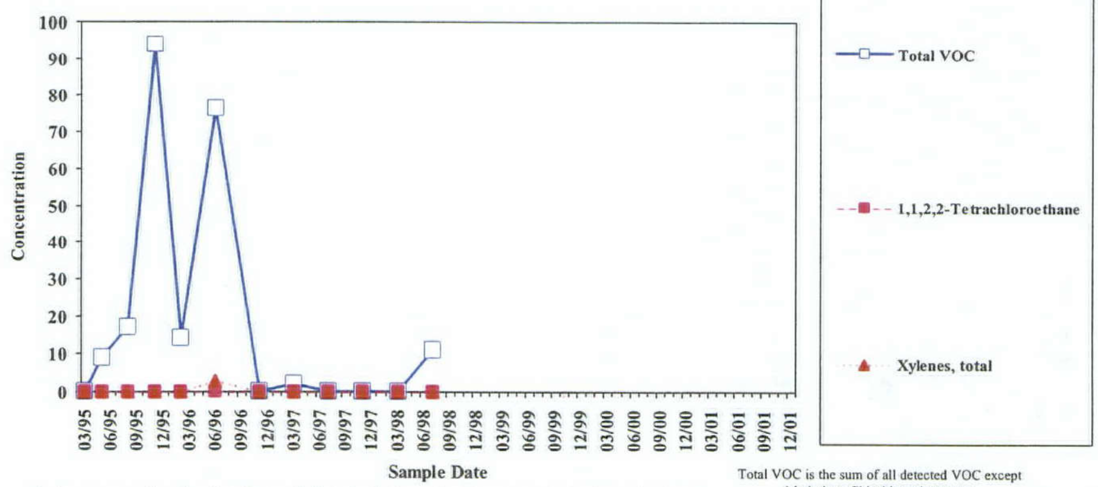
Sample concentration units: mg/Kg

Sample Location:

SED-02

Sites 1 & 3
Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/Kg

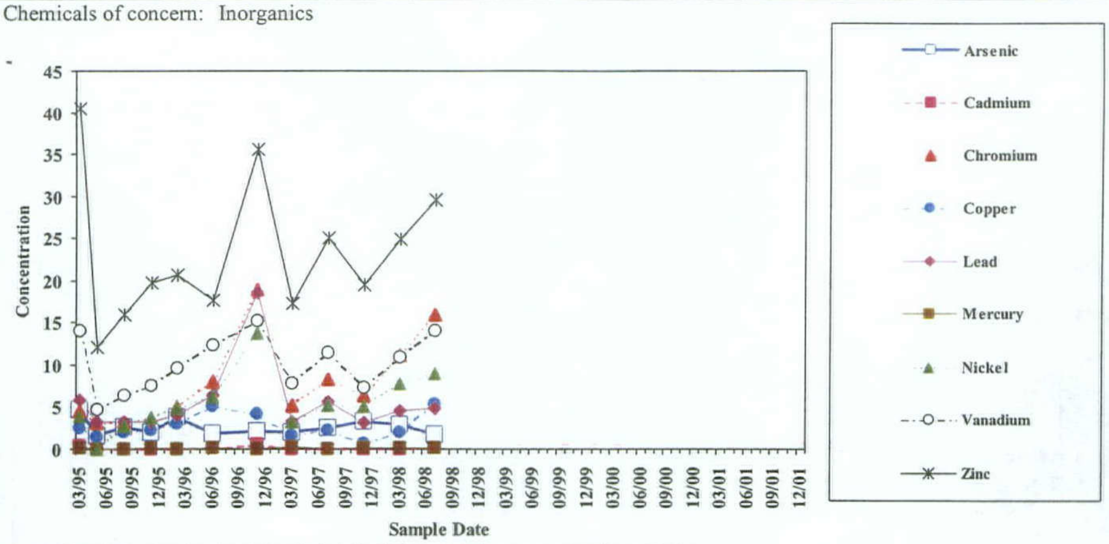
Sample Location:

SED-03

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

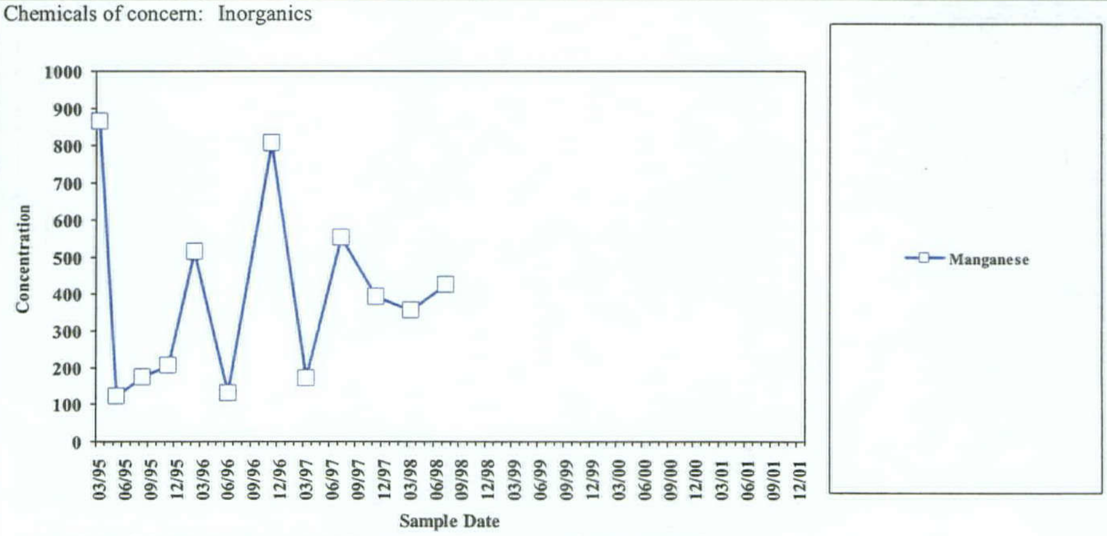
Sample Location:

SED-03

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

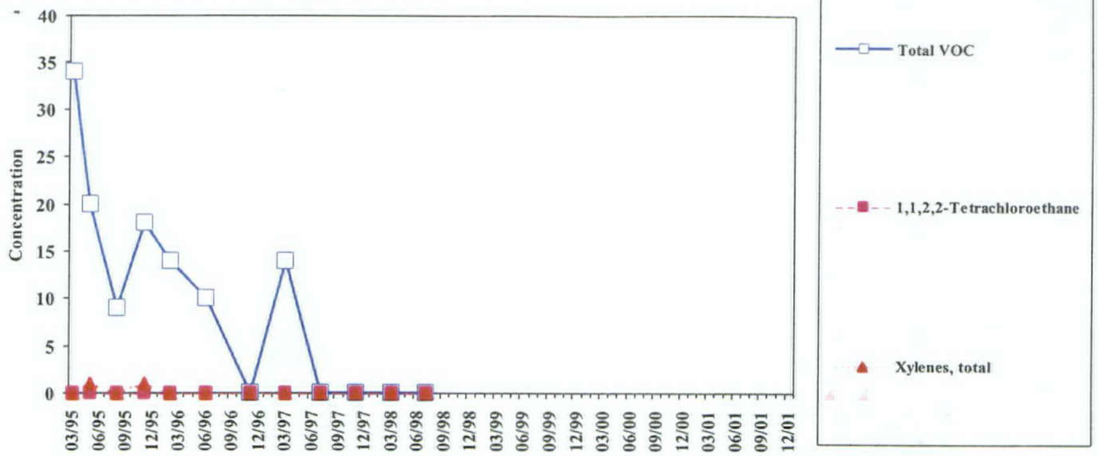
Sample concentration units: mg/Kg

Sample Location:

SED-03

Sites 1 & 3
Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

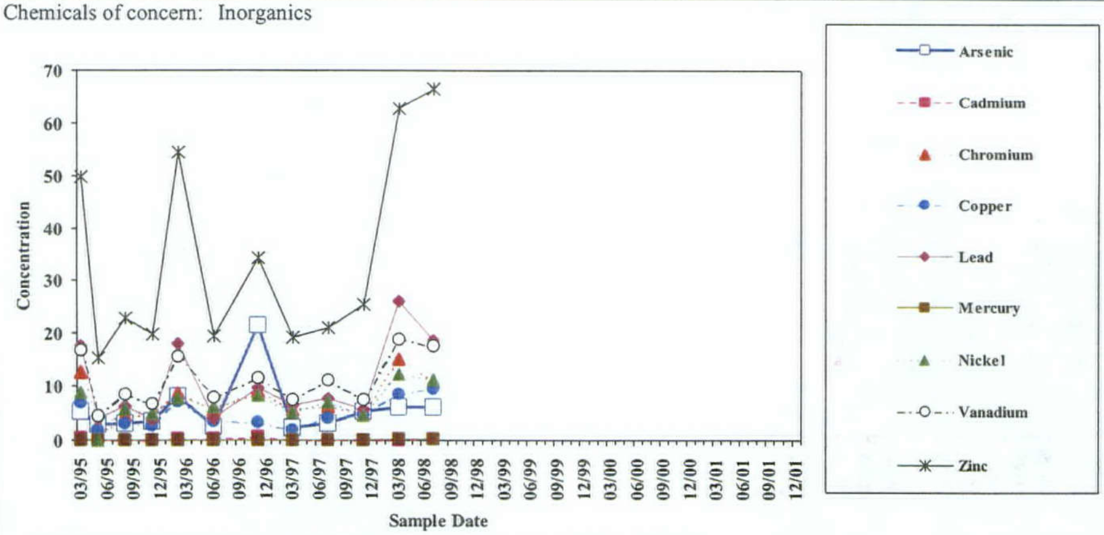
Sample concentration units: µg/Kg

Sample Location:

SED-04

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

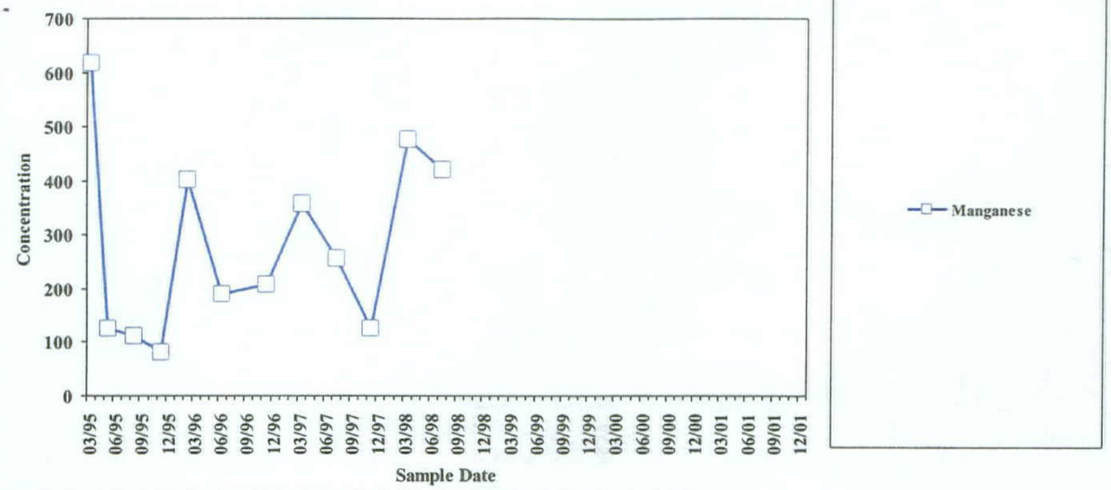
Sample concentration units: mg/Kg

Sample Location:

SED-04

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

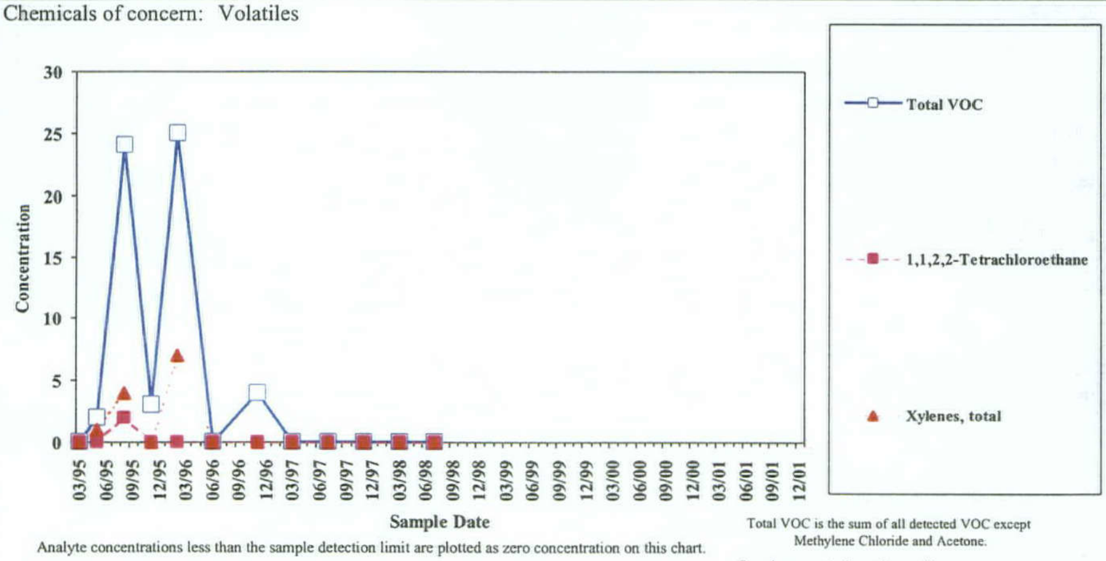
Sample concentration units: mg/Kg

Sample Location:

SED-04

Sites 1 & 3
Sediment

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/Kg

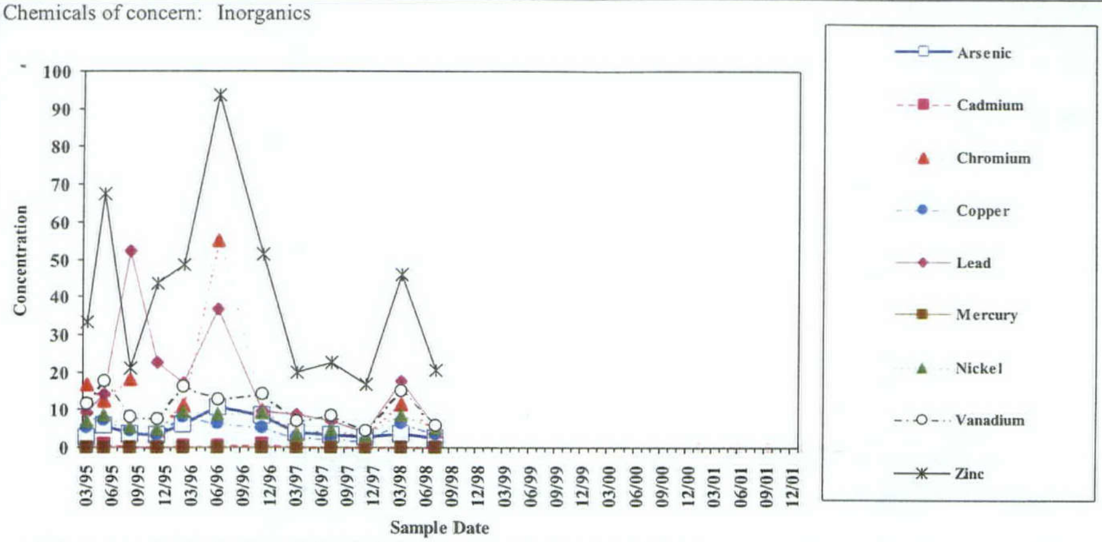
Sample Location:

SED-05

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

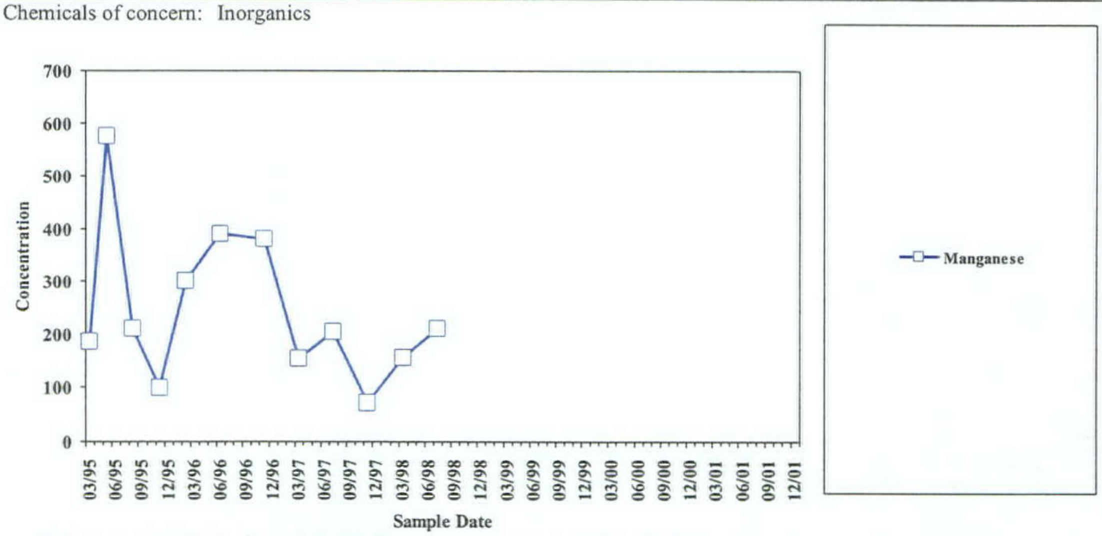
Sample Location:

SED-05

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

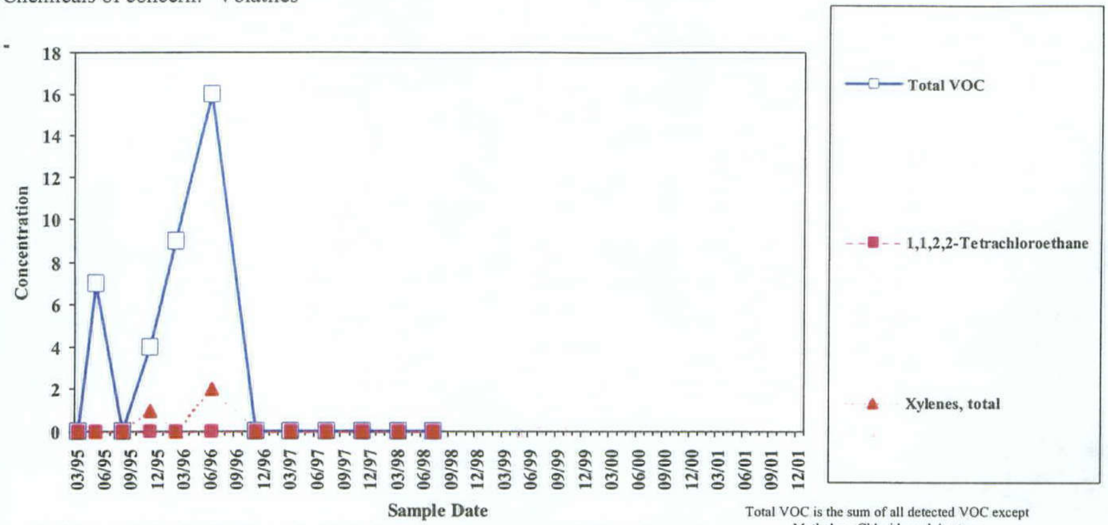
Sample Location:

SED-05

Sites 1 & 3

Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/Kg

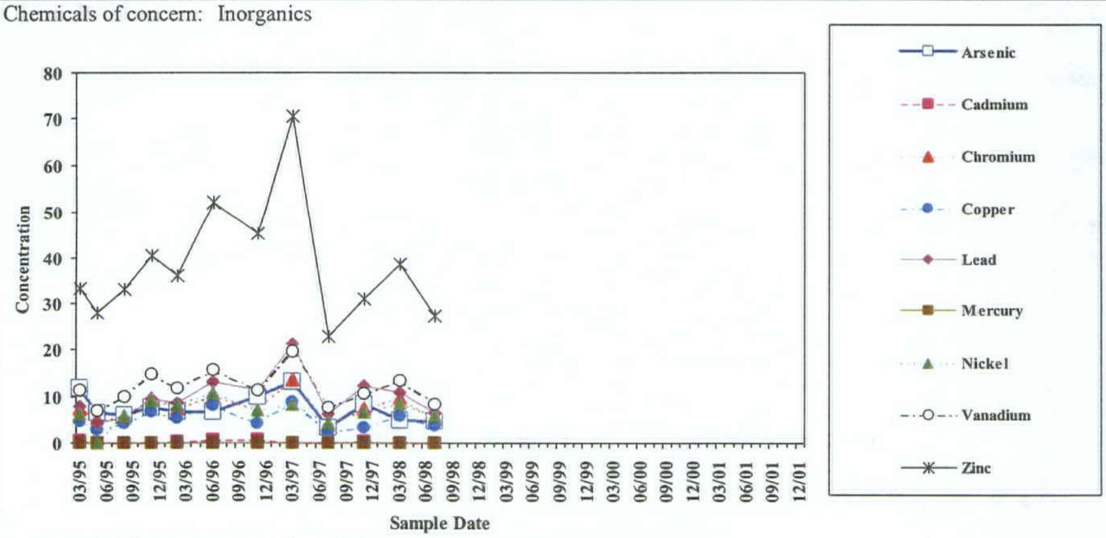
Sample Location:

SED-06

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

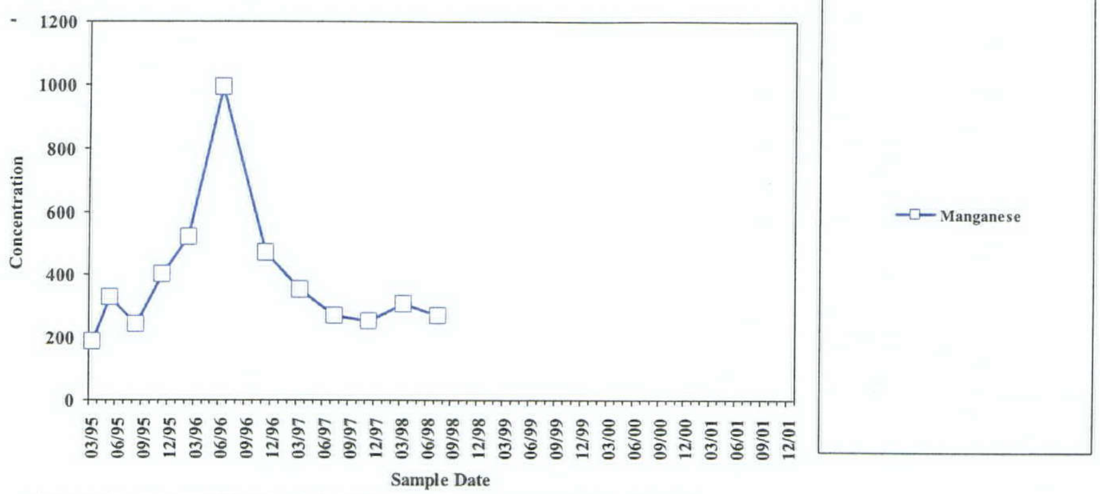
Sample concentration units: mg/Kg

Sample Location:

SED-06

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

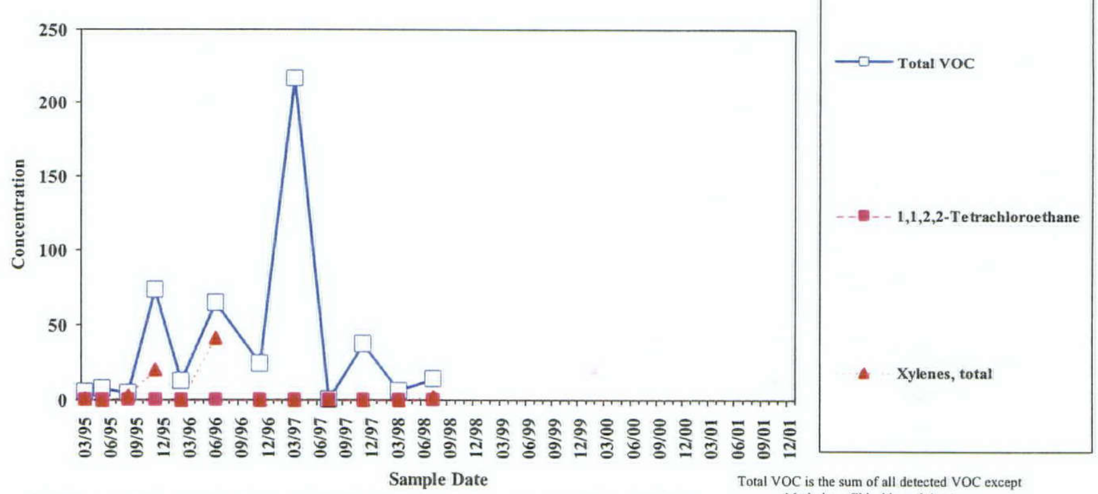
Sample concentration units: mg/Kg

Sample Location:

SED-06

Sites 1 & 3
Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

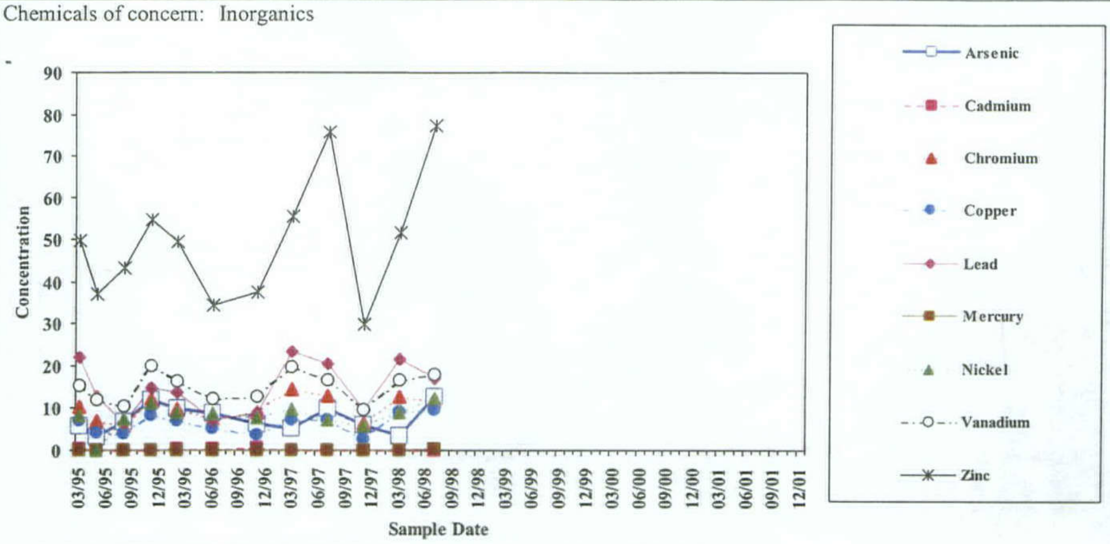
Sample concentration units: µg/Kg

Sample Location:

SED-07

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

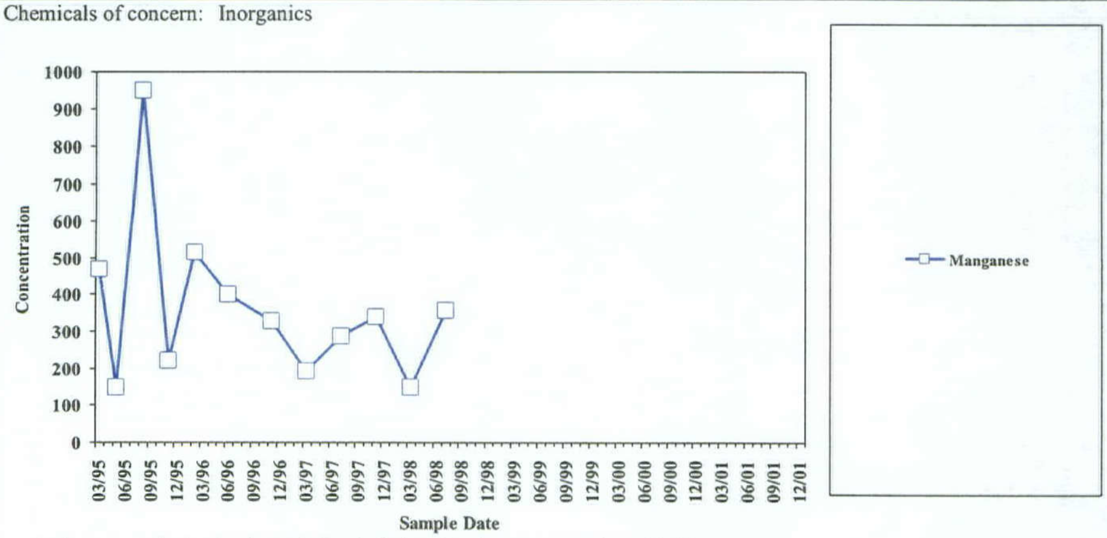
Figure 101 of 171

Sample Location:

SED-07

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

Figure 102 of 171

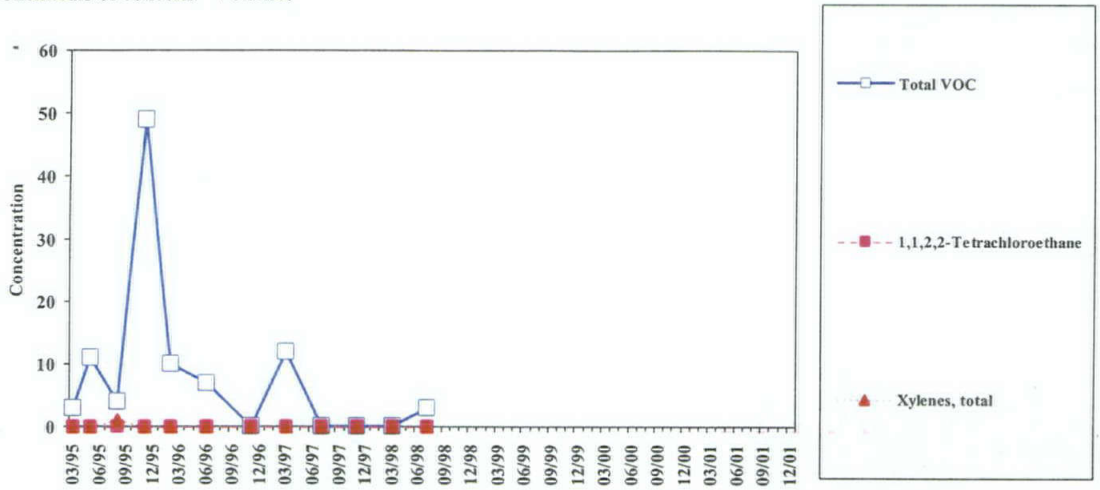
Sample Location:

SED-07

Sites 1 & 3

Sediment

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/Kg

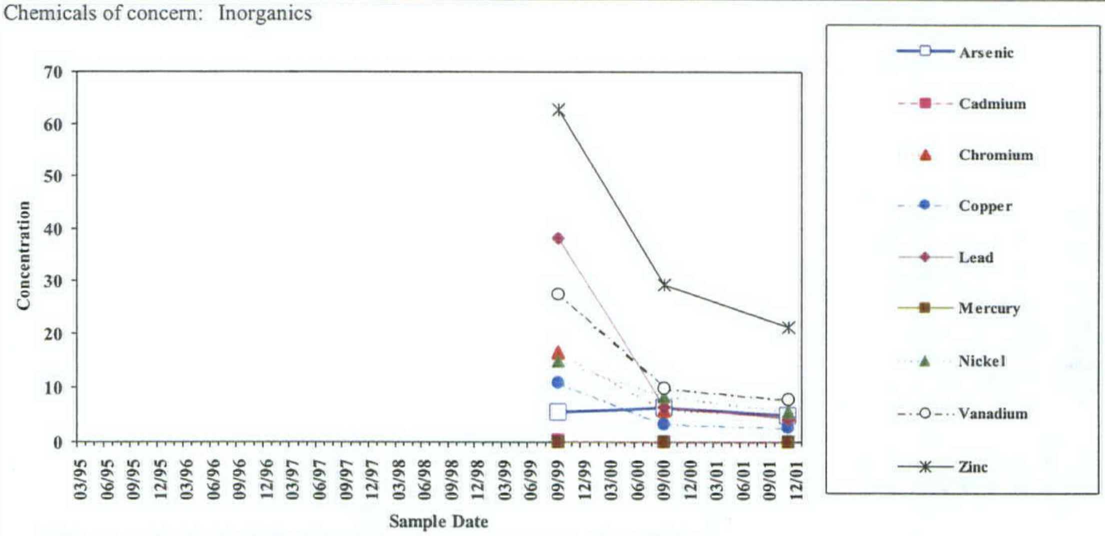
Sample Location:

SED-09

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

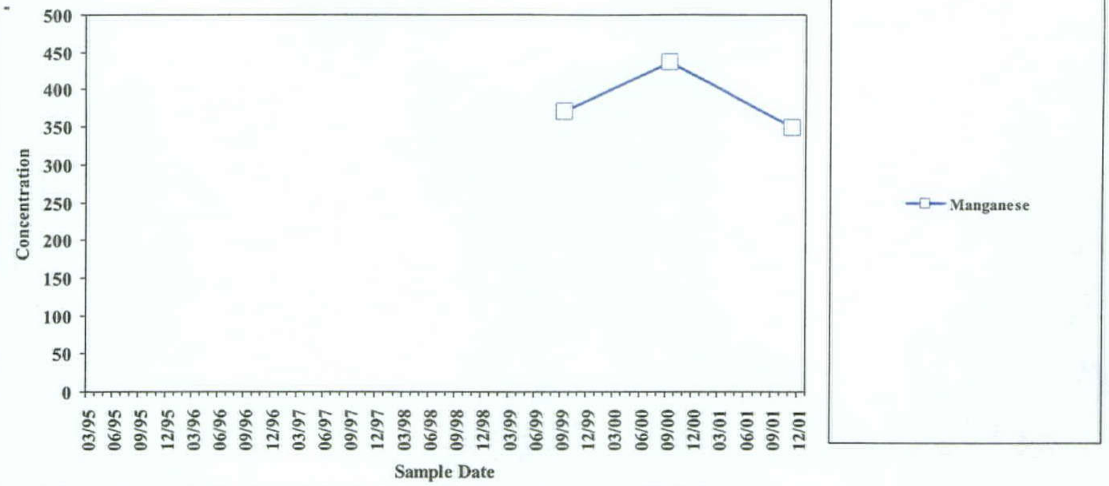
Sample concentration units: mg/Kg

Sample Location:

SED-09

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

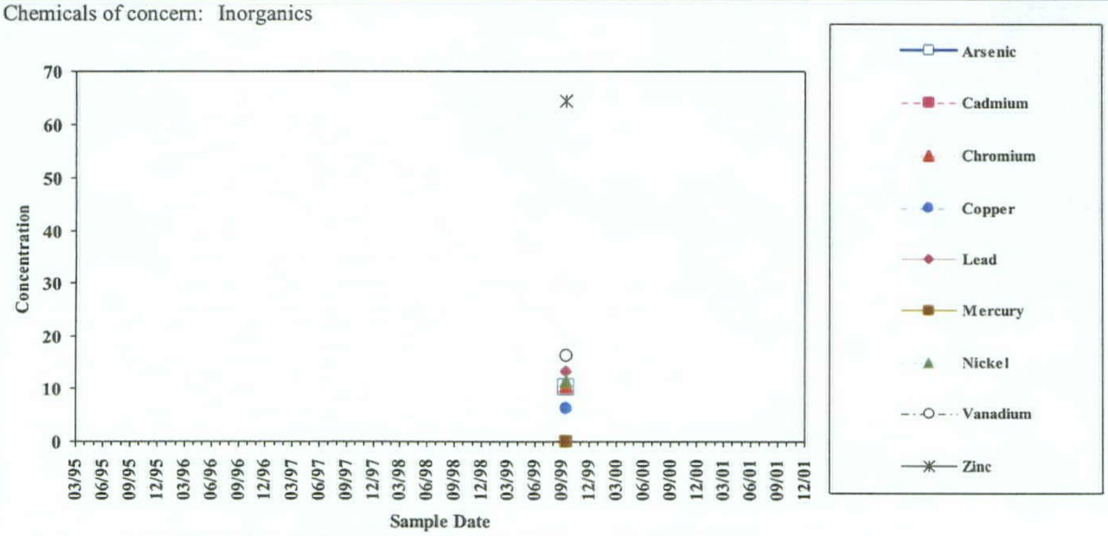
Sample concentration units: mg/Kg

Sample Location:

SED-11

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

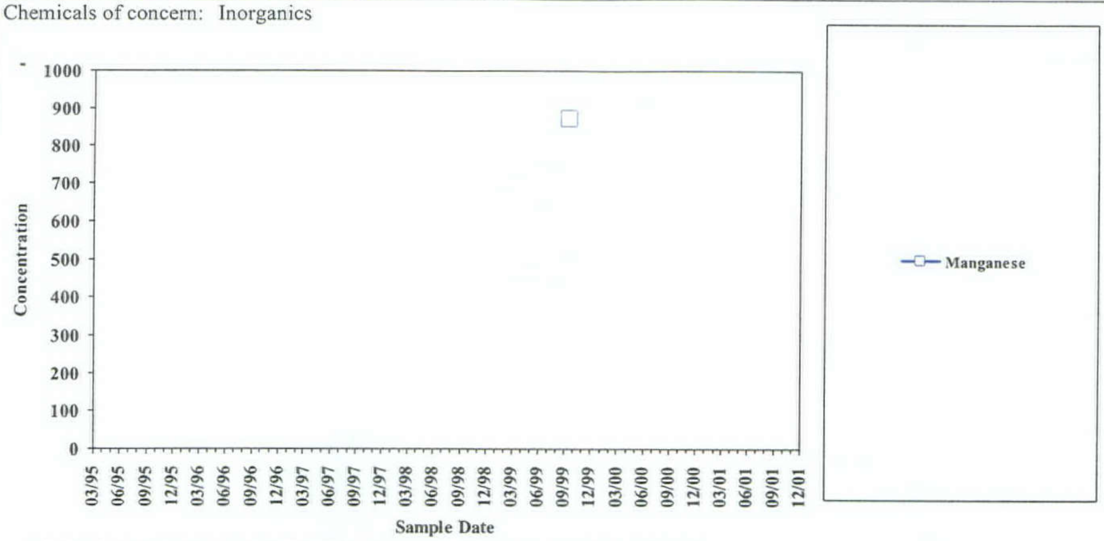
Sample concentration units: MG/KG

Sample Location:

SED-11

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

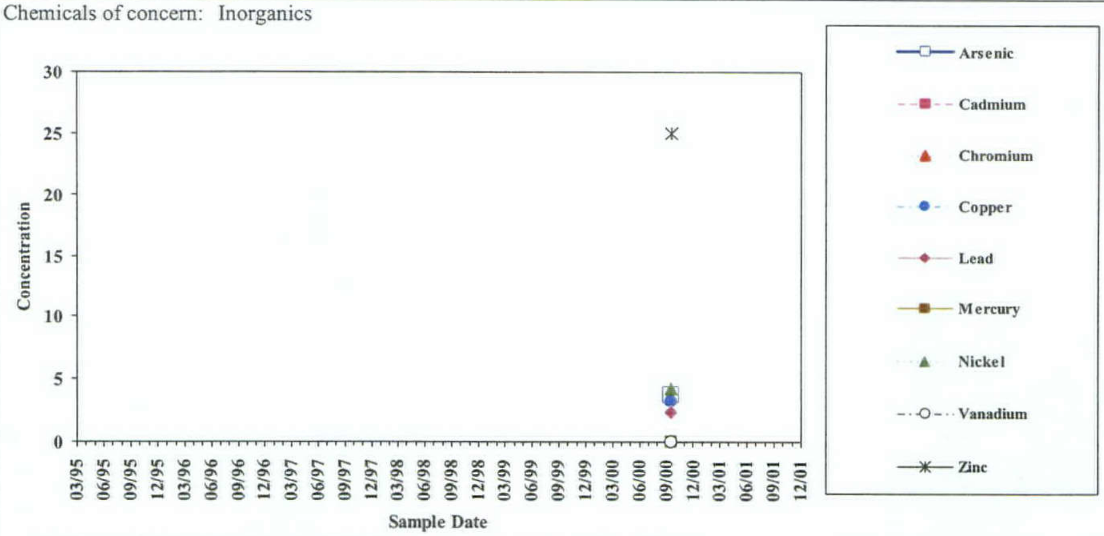
Sample concentration units: MG/KG

Sample Location:

SED-15

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

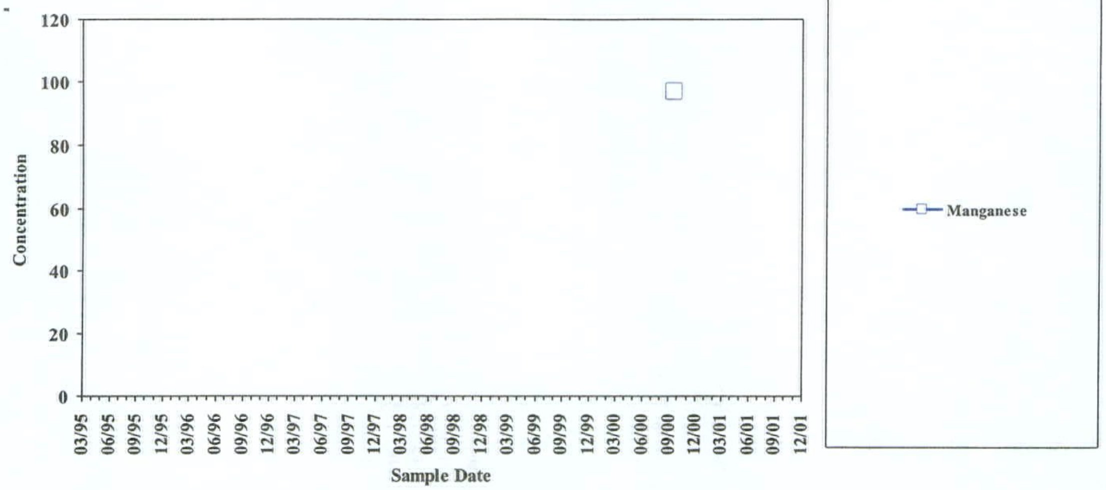
Sample Location:

SED-15

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

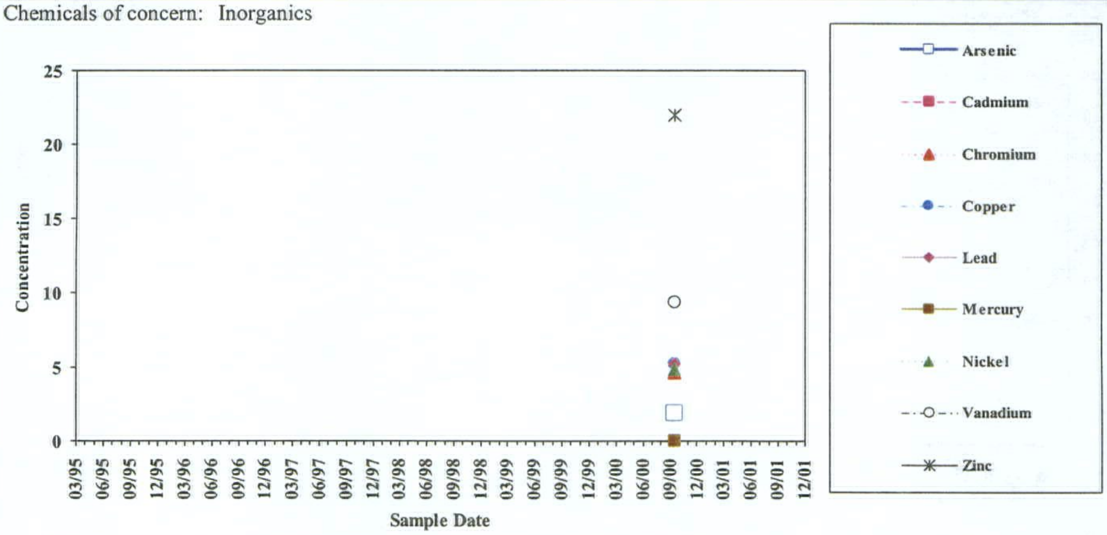
Sample Location:

SED-16

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

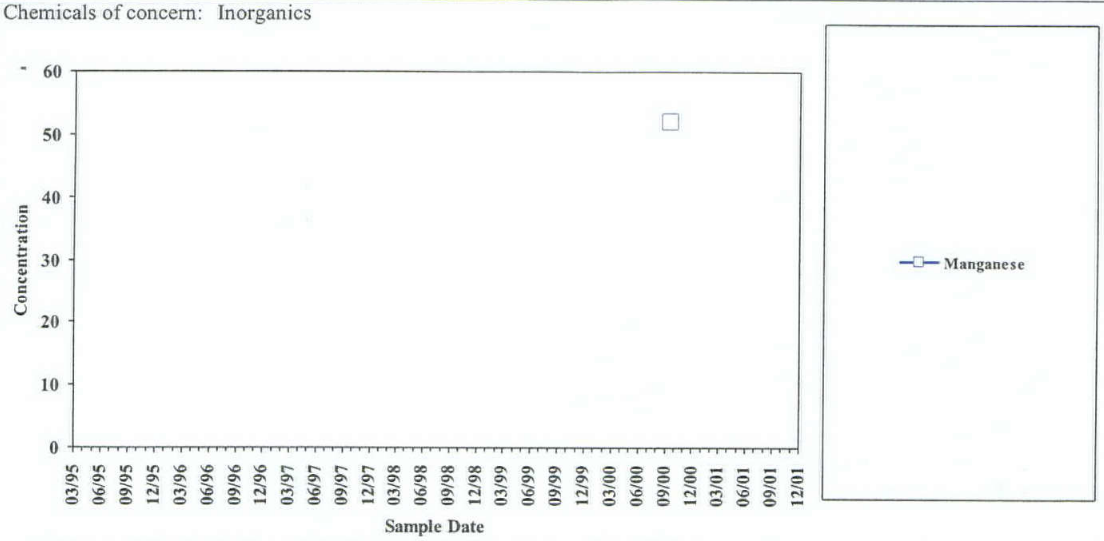
Sample concentration units: mg/Kg

Sample Location:

SED-16

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

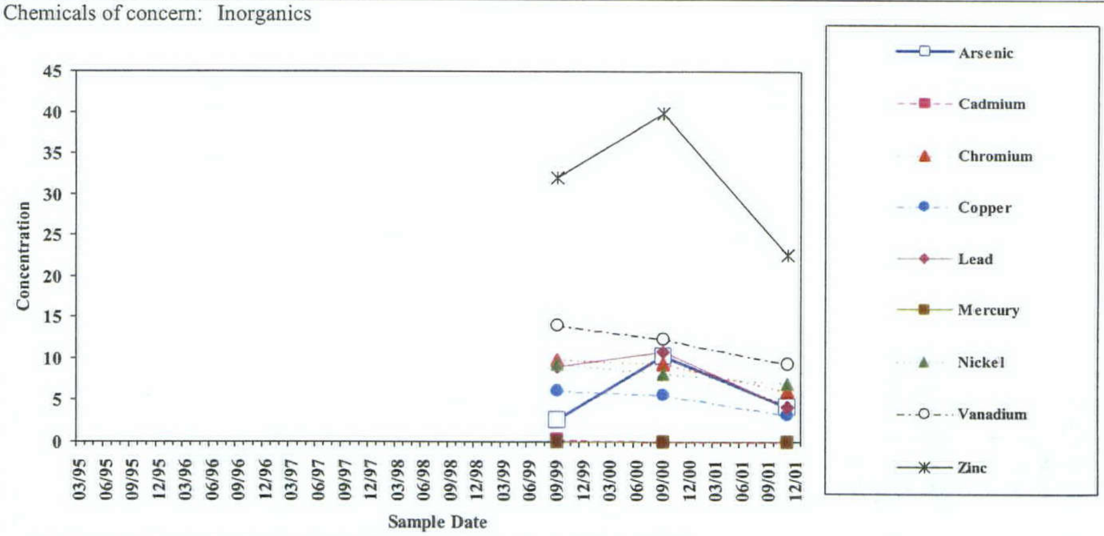
Sample concentration units: mg/Kg

Sample Location:

SED-17

Sites 1 & 3
Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

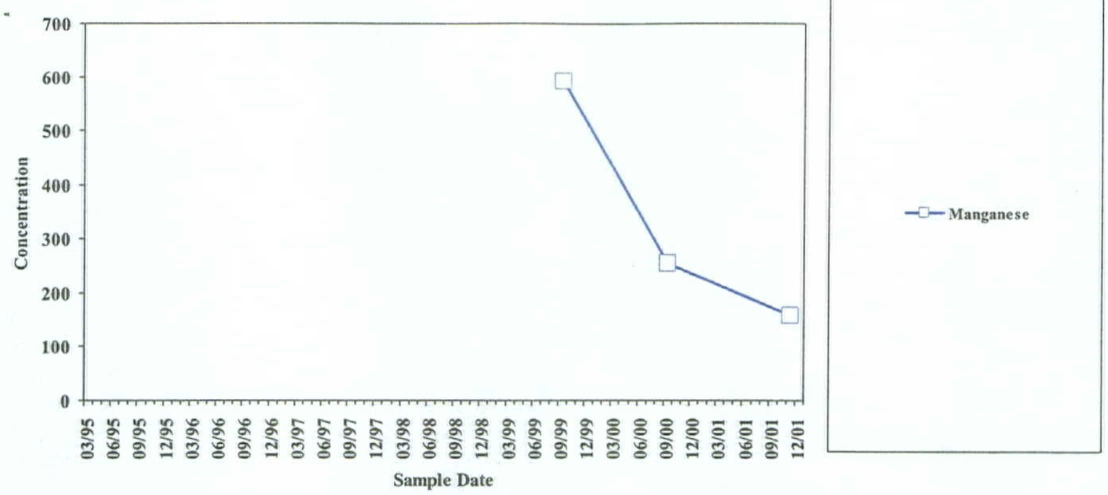
Sample Location:

SED-17

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

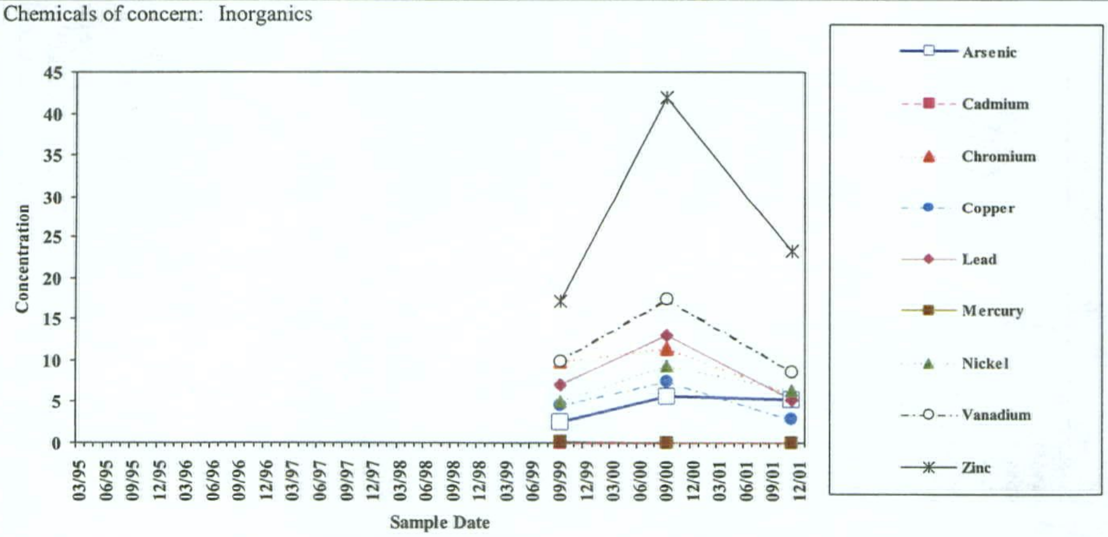
Sample Location:

SED-18

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

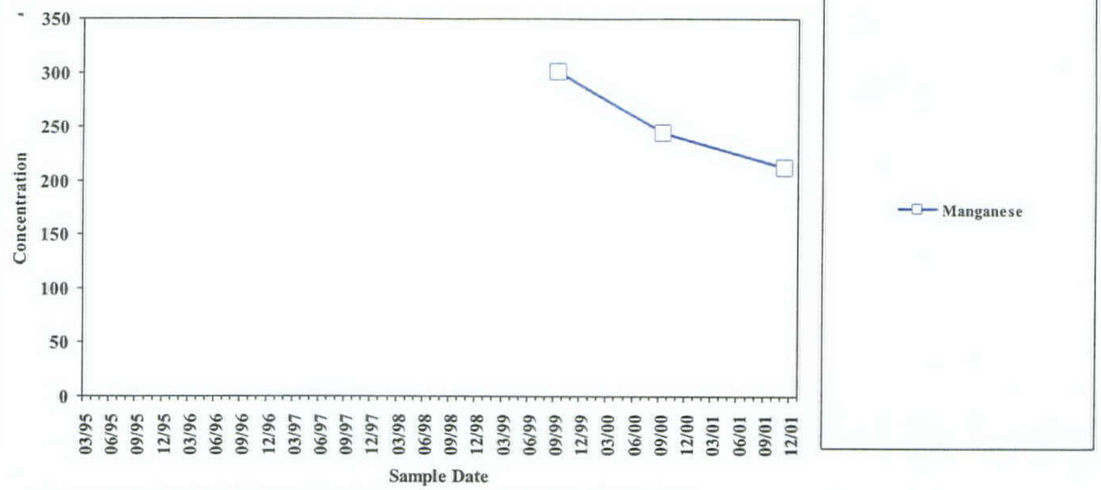
Sample Location:

SED-18

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

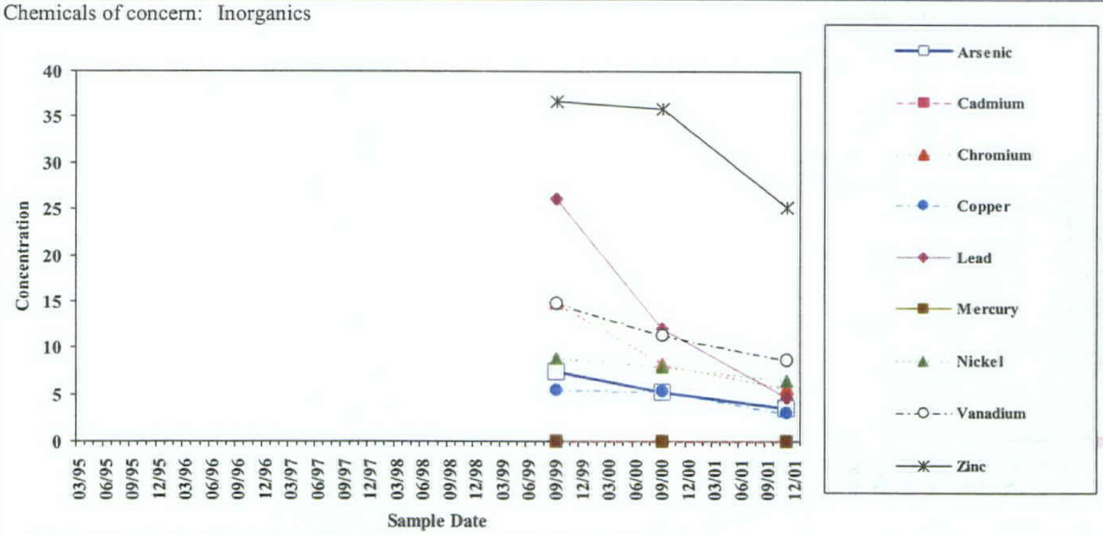
Sample Location:

SED-19

Sites 1 & 3

Sediment

Chemicals of concern: Inorganics



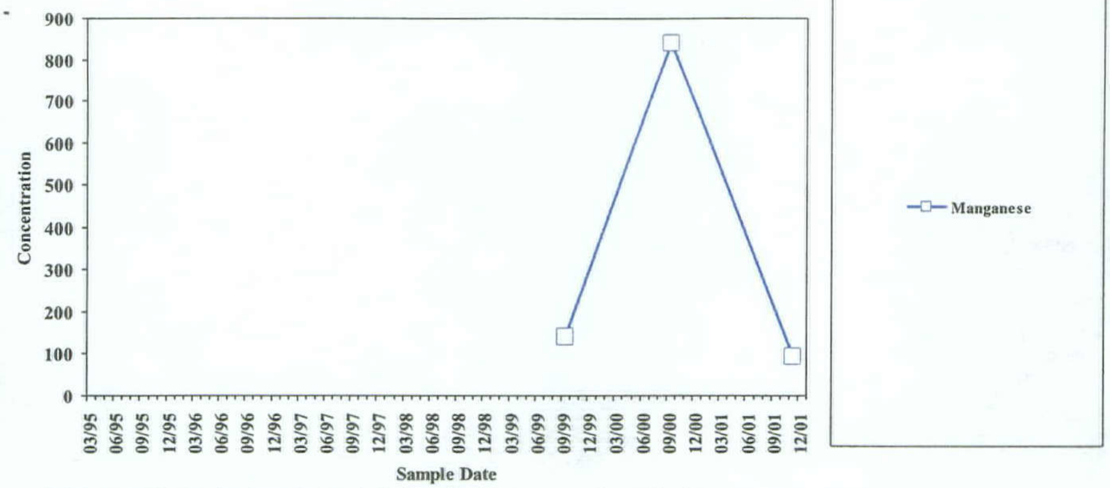
Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

Sample Location: Sites 1 & 3

SED-19 Sediment

Chemicals of concern: Inorganics



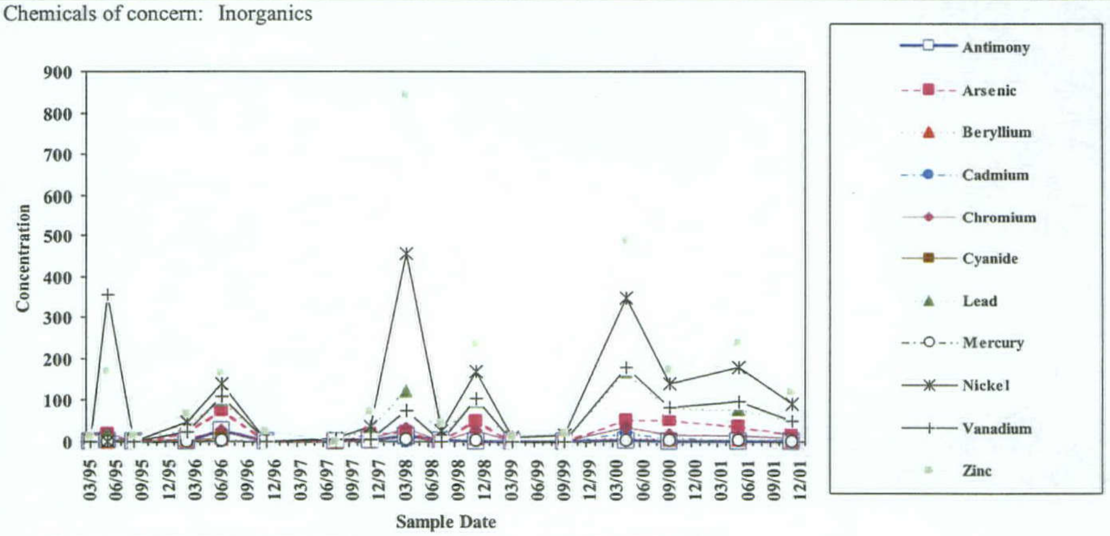
Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/Kg

Sample Location: Sites 1 & 3

SEEP-01 Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

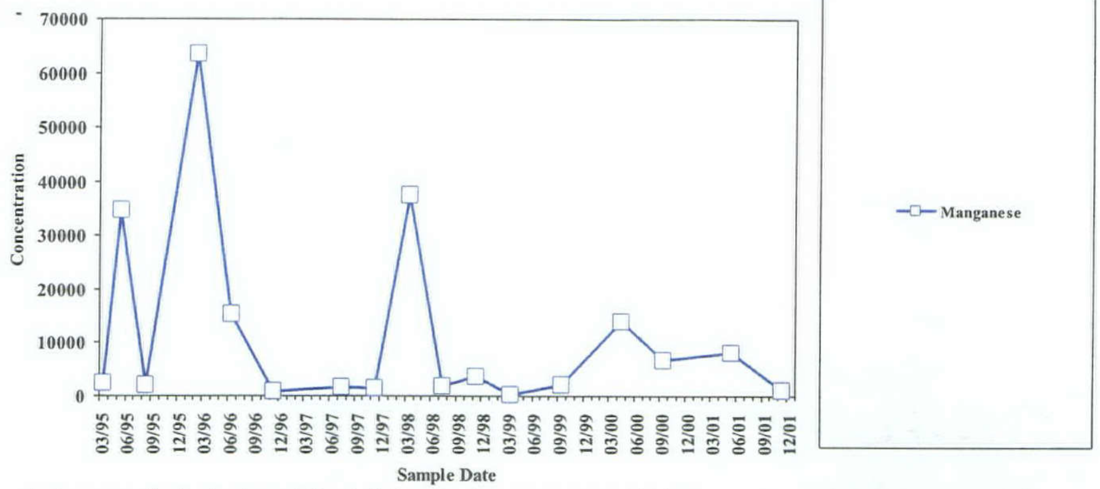
Sample concentration units: µg/L

Sample Location:

SEEP-01

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

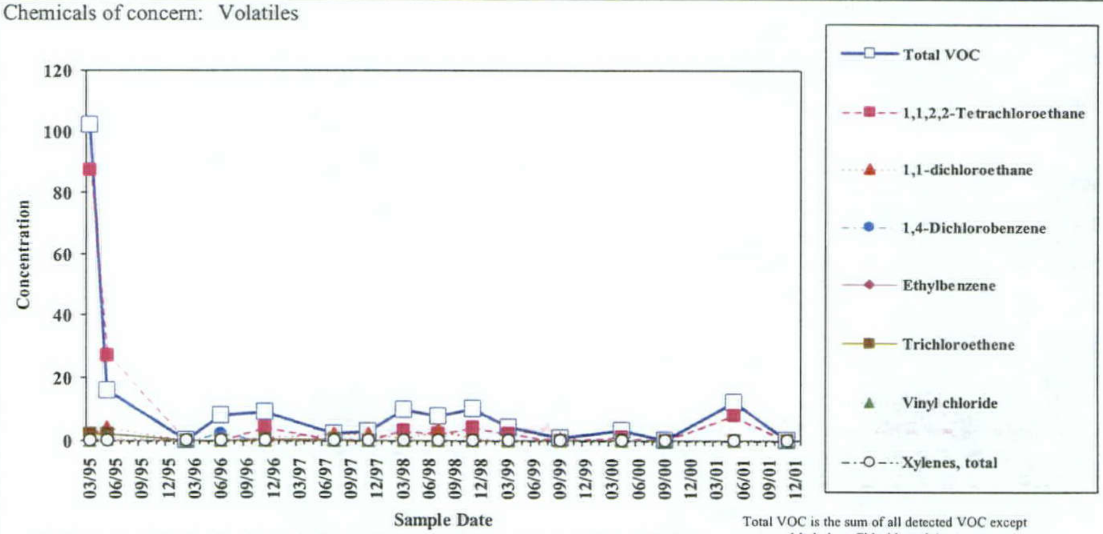
Sample concentration units: µg/L

Sample Location:

SEEP-01

Sites 1 & 3
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

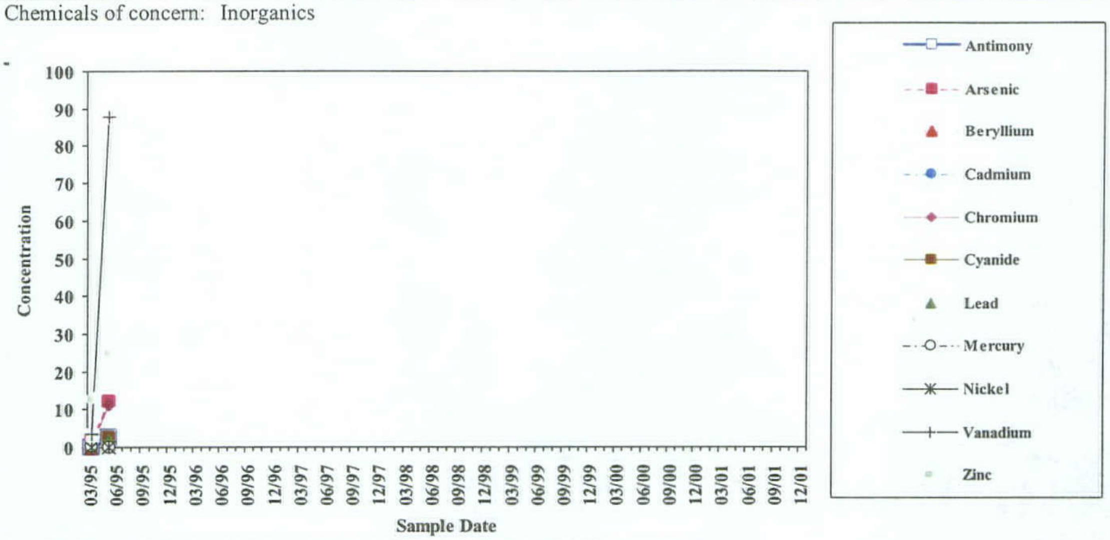
Sample concentration units: µg/L

Sample Location:

SEEP-02

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: mg/L

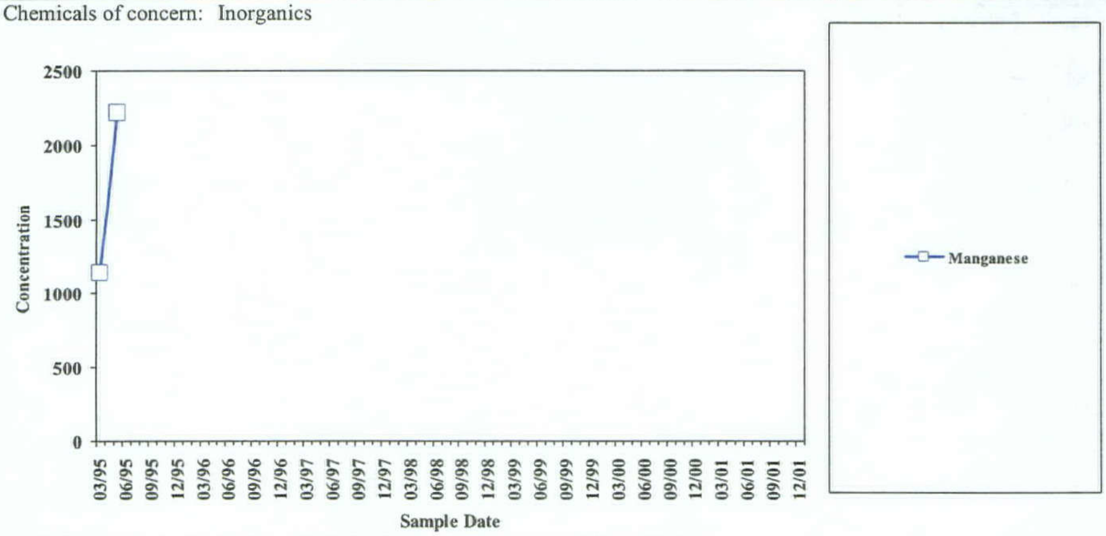
Figure 121 of 171

Sample Location:

SEEP-02

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

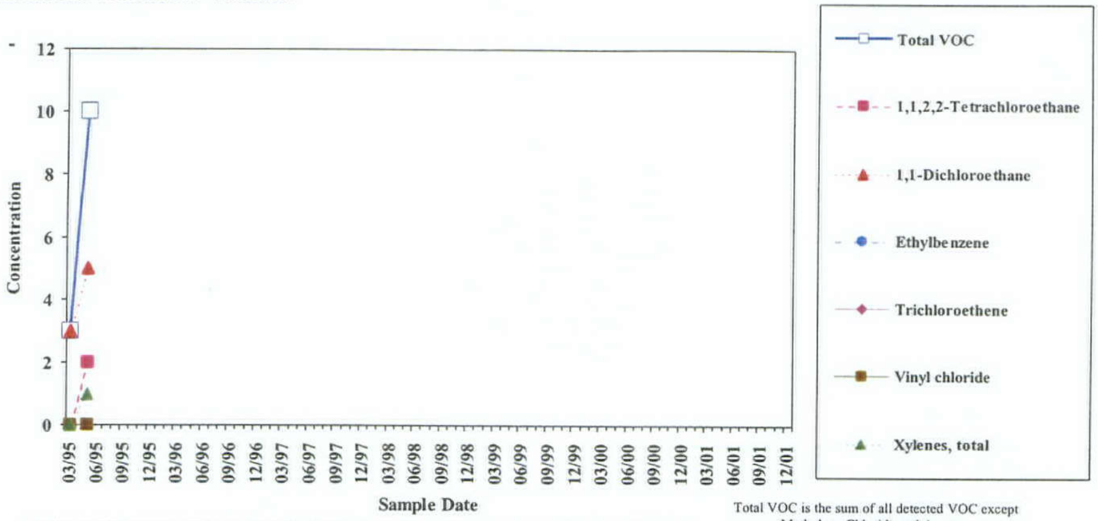
Figure 122 of 171

Sample Location:

SEEP-02

Sites 1 & 3
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

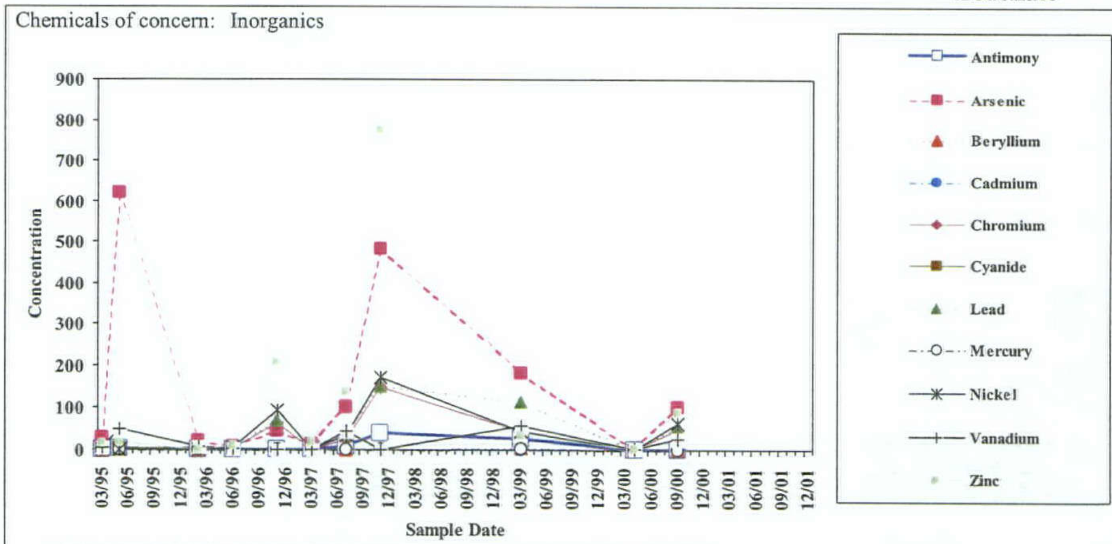
Sample concentration units: µg/L

Sample Location:

SEEP-03

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

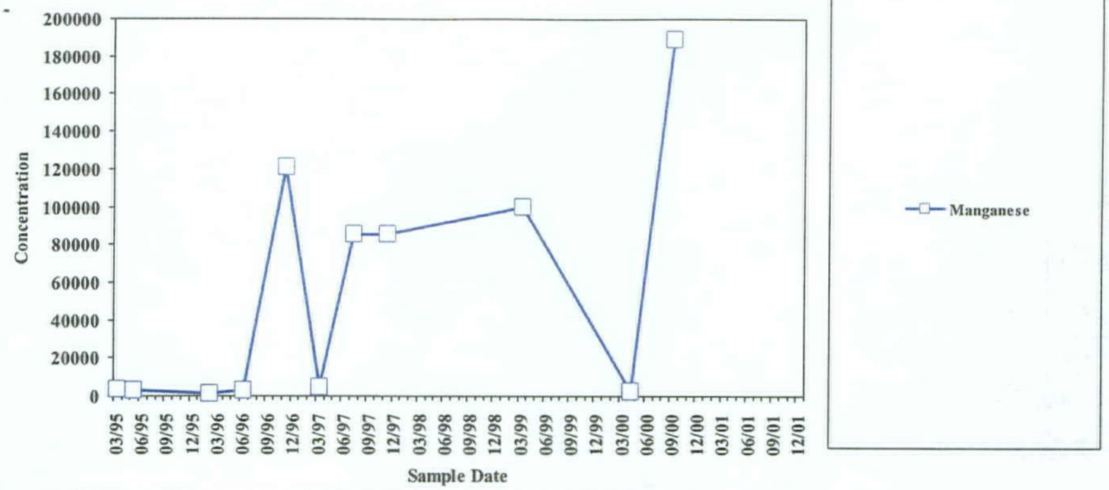
Sample Location:

SEEP-03

Sites 1 & 3

Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

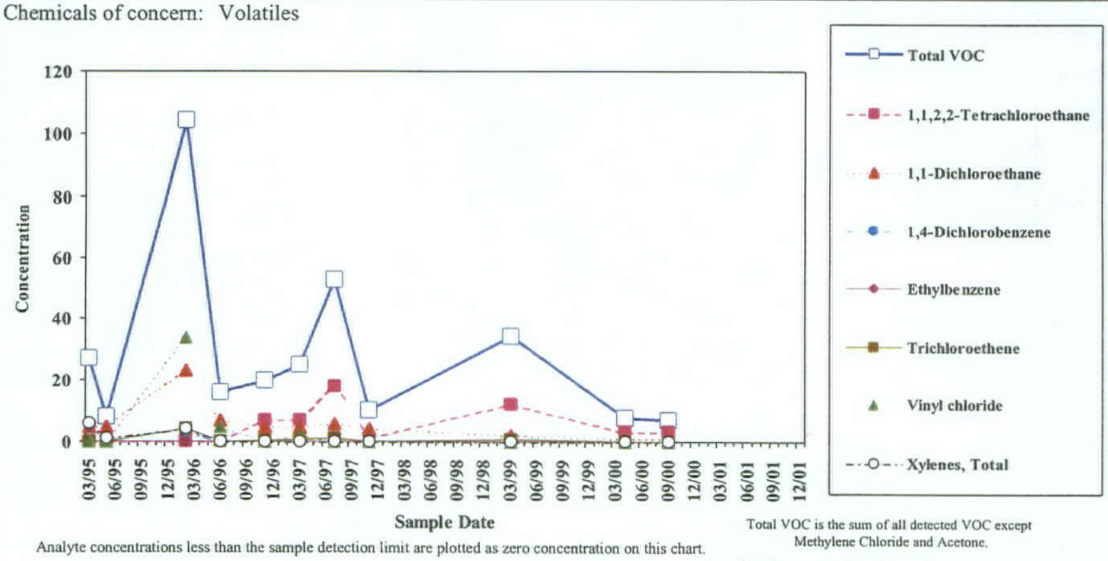
Sample Location:

SEEP-03

Sites 1 & 3

Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

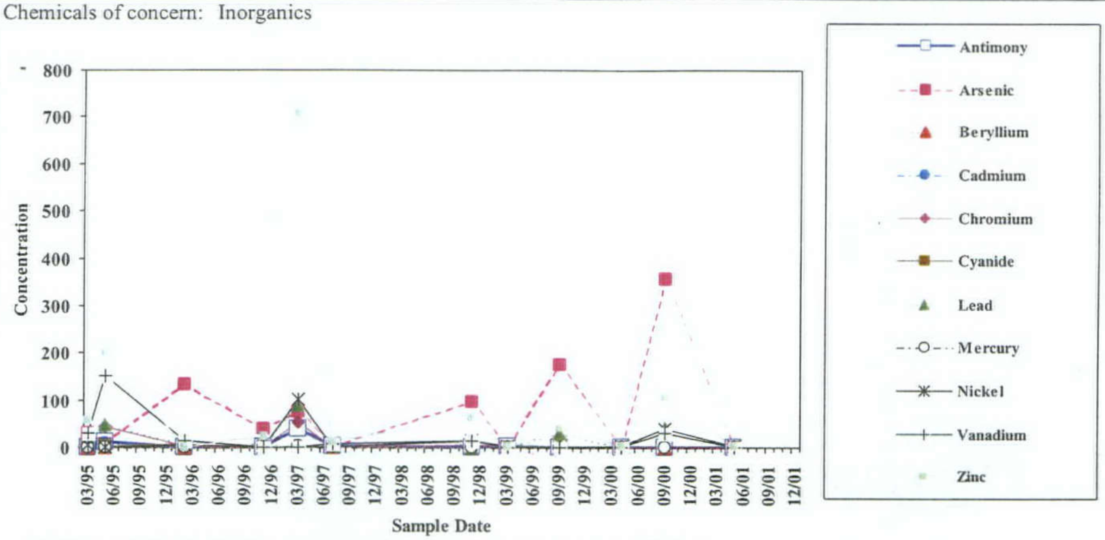
Sample concentration units: µg/L

Sample Location:

SEEP-04

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

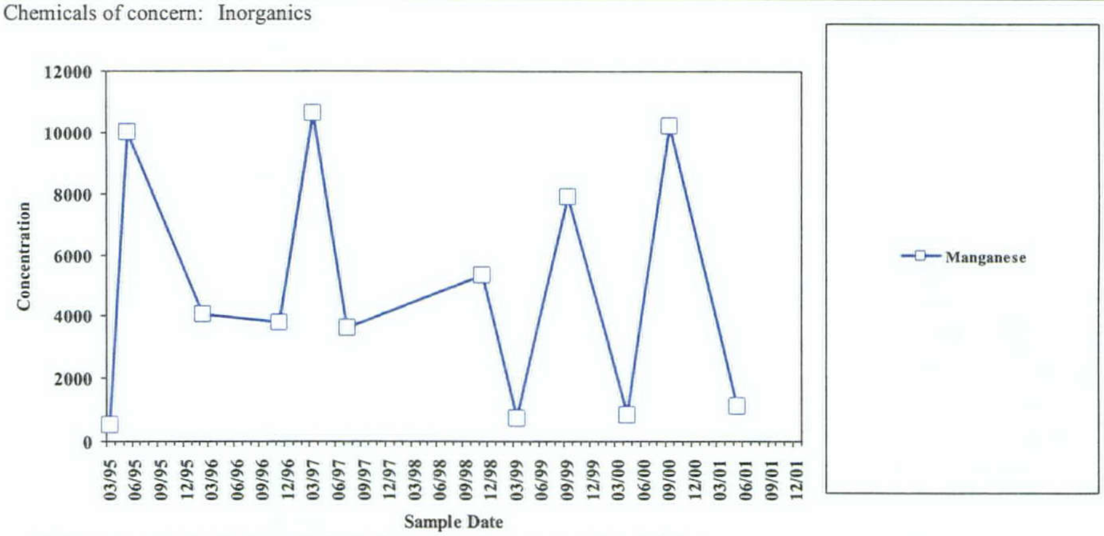
Sample concentration units: mg/L

Sample Location:

SEEP-04

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

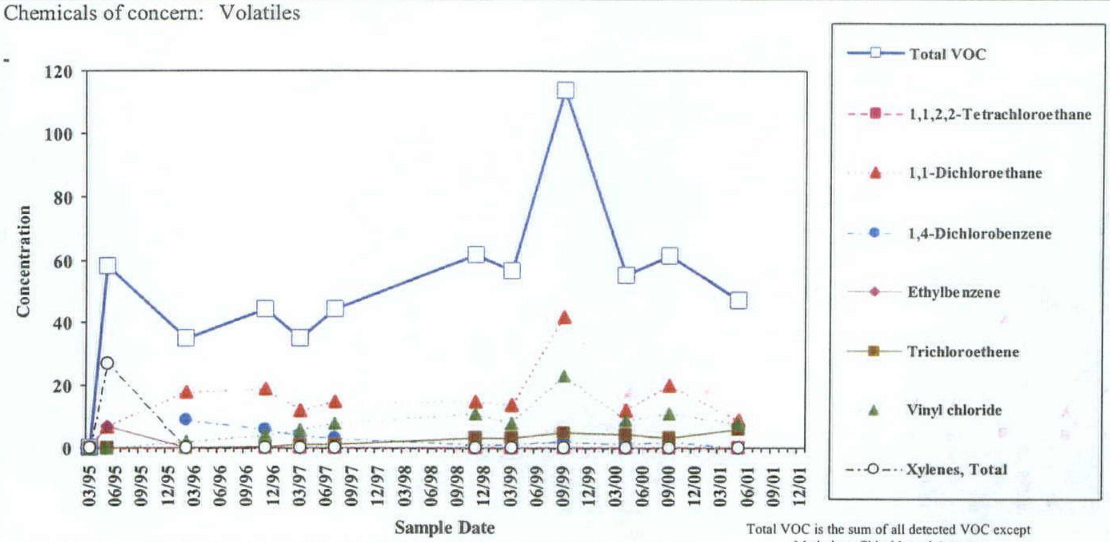
Sample concentration units: µg/L

Sample Location:

SEEP-04

Sites 1 & 3
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

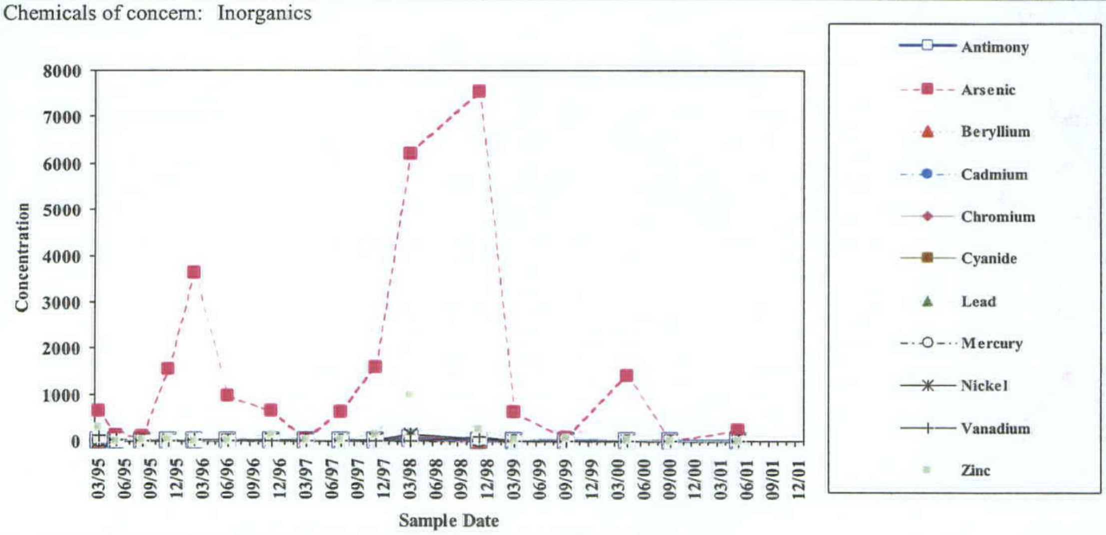
Sample concentration units: µg/L

Sample Location:

SEEP-05

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

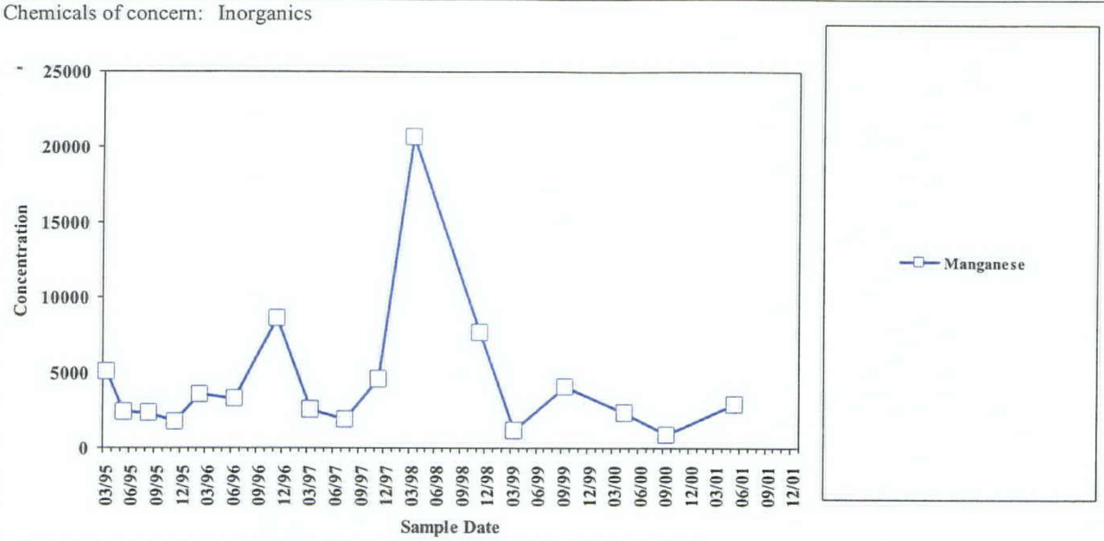
Sample concentration units: µg/L

Sample Location:

SEEP-05

Sites 1 & 3
Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

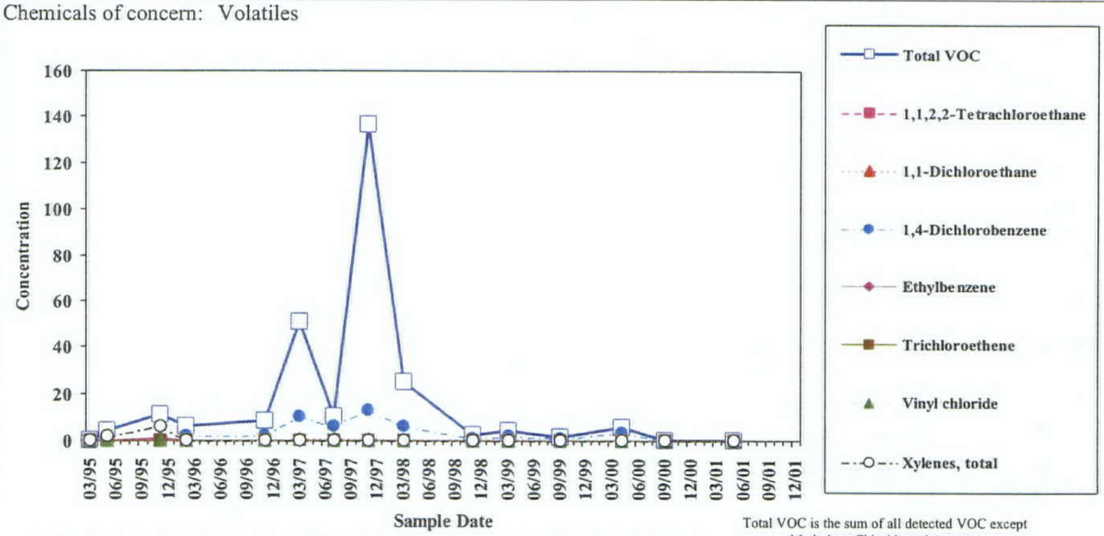
Sample concentration units: µg/L

Sample Location:

SEEP-05

Sites 1 & 3
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

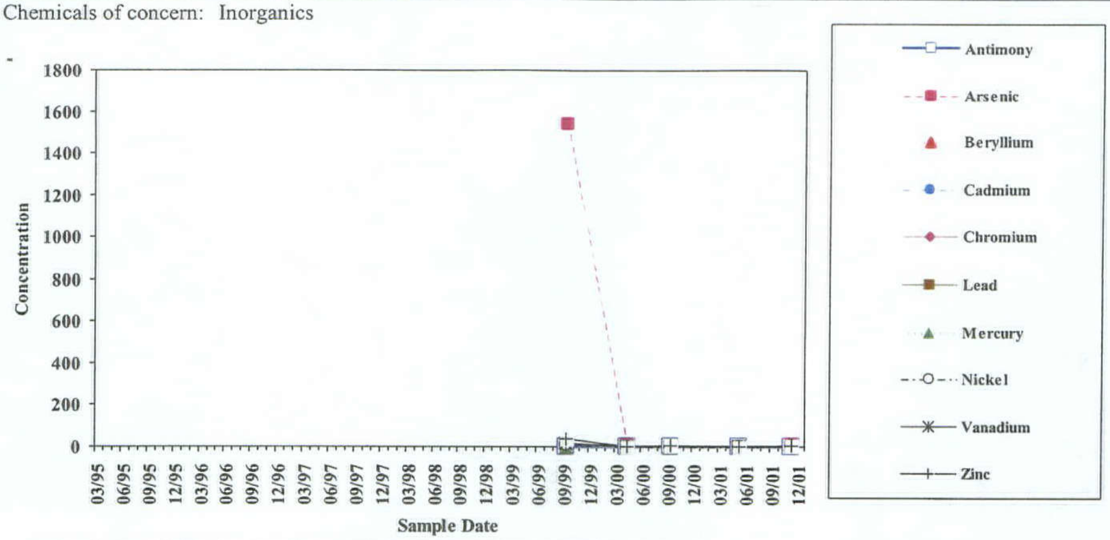
Sample Location:

SEEP-09

Sites 1 & 3

Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Figure 133 of 171

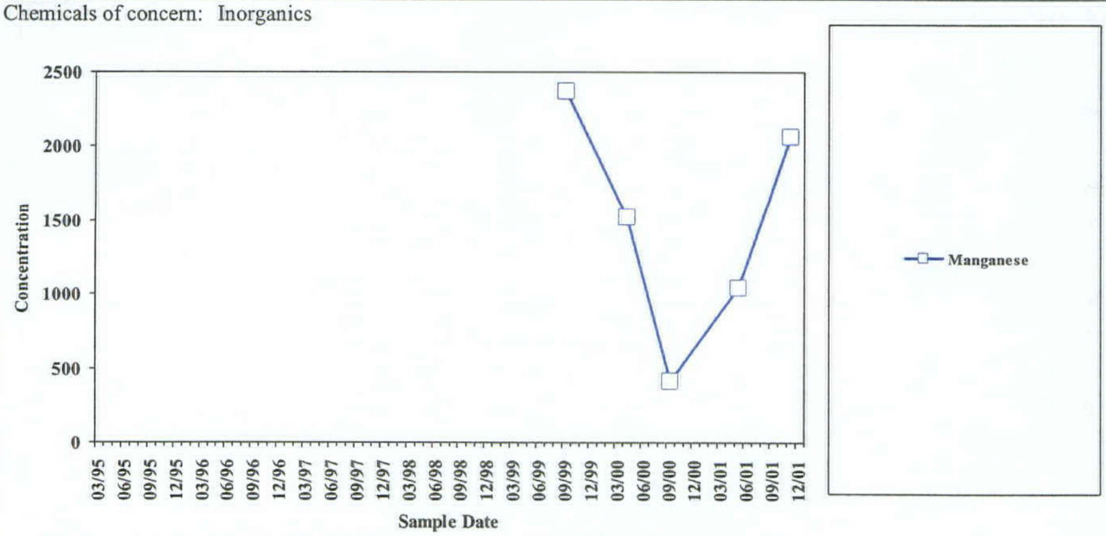
Sample Location:

SEEP-09

Sites 1 & 3

Leachate

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

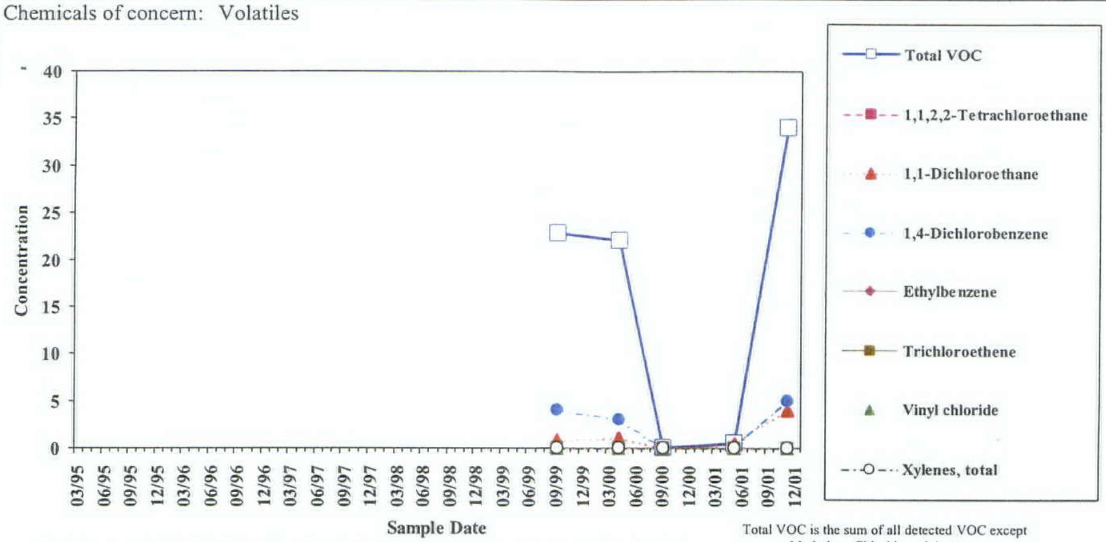
Figure 134 of 171

Sample Location:

SEEP-09

Sites 1 & 3
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

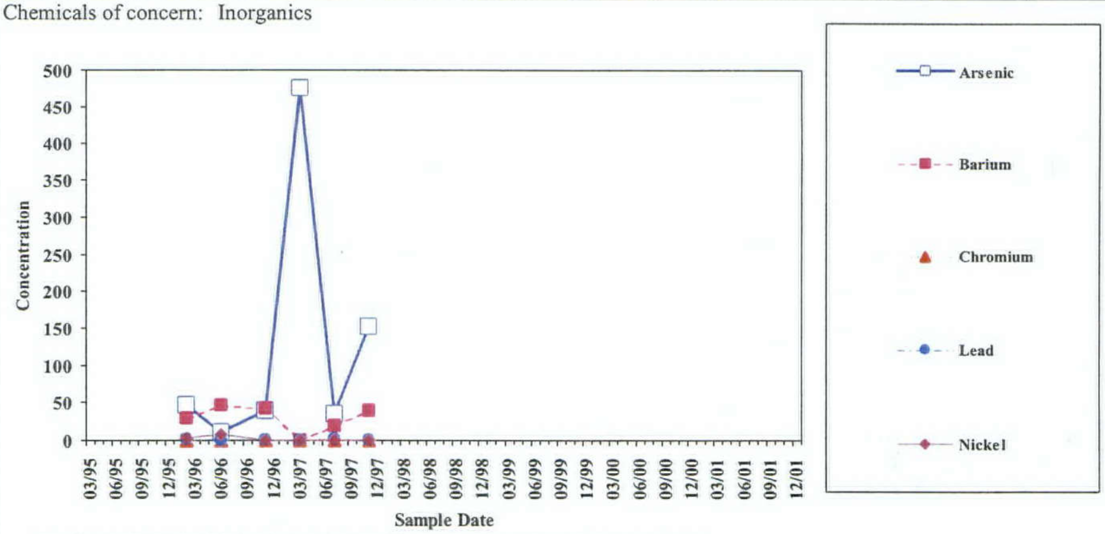
Sample concentration units: µg/L

Sample Location:

Sites 1 & 3 Raw Influent

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

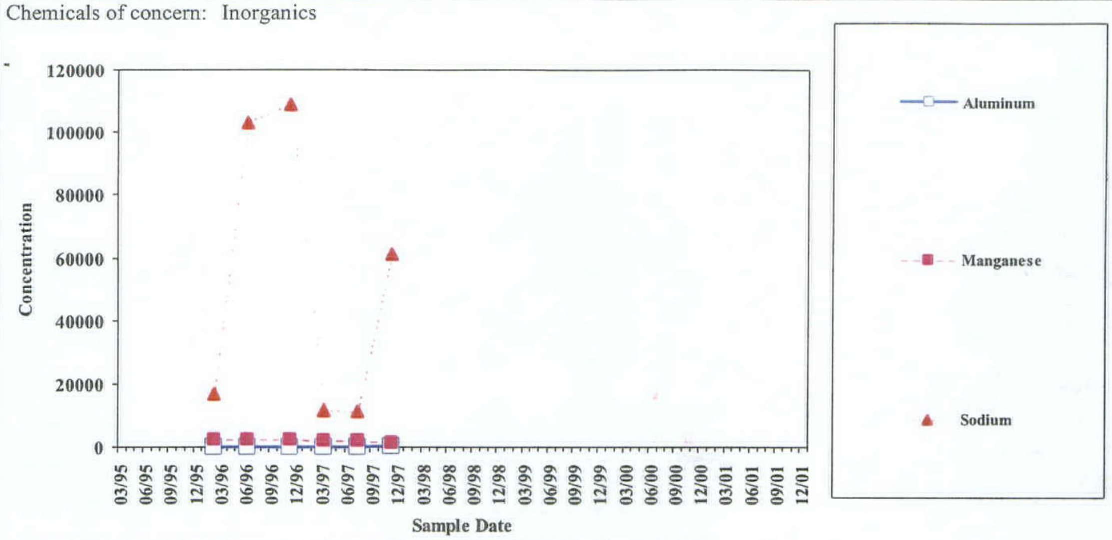
Arsenic		Barium		Chromium		Lead		Nickel	
MEG:	-	MEG:	1500	MEG:	100	MEG:	-	MEG:	100
MCL:	50	MCL:	2000	MCL:	100	MCL:	15	MCL:	100

Sample Location:

Sites 1 & 3 Raw Influent

Sites 1 & 3
Ground Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

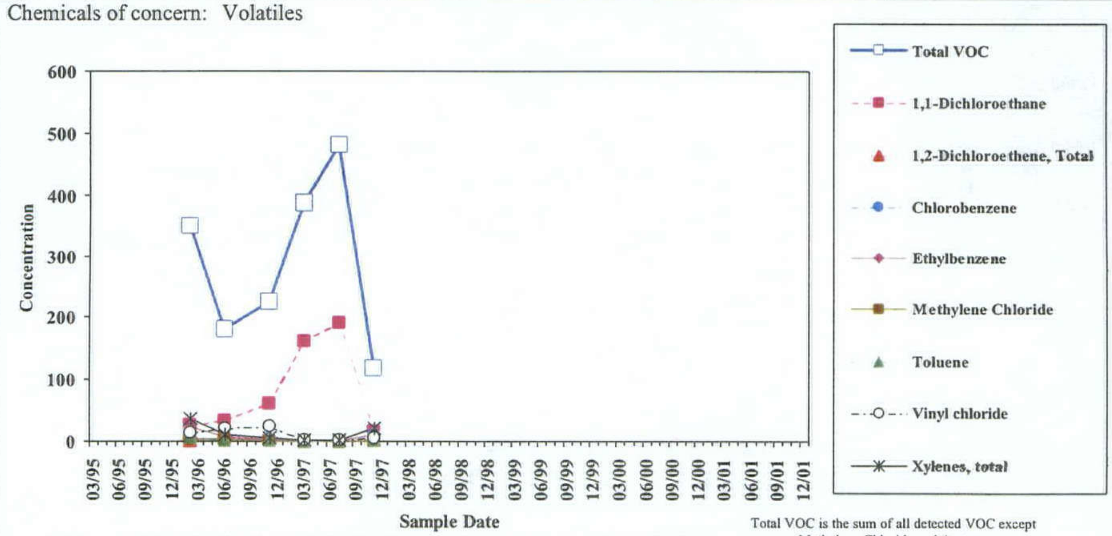
Aluminum		Manganese		Sodium	
MEG:	1430	MEG:	200	MEG:	-
MCL:	200	MCL:	50	MCL:	-

Sample Location:

Sites 1 & 3 Raw Influent

Sites 1 & 3
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

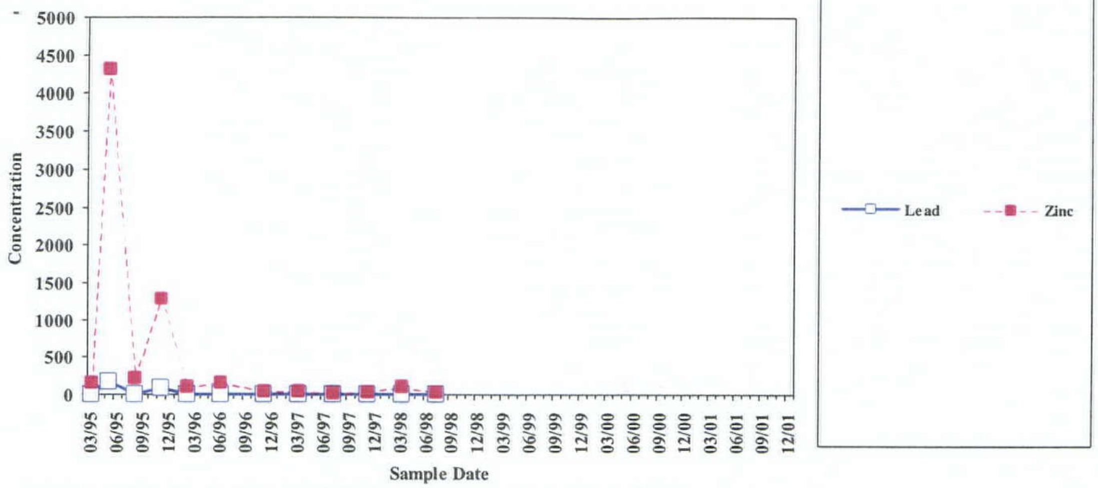
1,1-Dichloroethane		1,2-Dichloroethene, total		Chlorobenzene		Ethylbenzene		Methylene chloride		Toluene		Vinyl Chloride		Xylenes, total	
MEG:	70	MEG:	70	MEG:	47	MEG:	700	MEG:	-	MEG:	1400	MEG:	0.15	MEG:	600
MCL:	-	MCL:	70	MCL:	100	MCL:	700	MCL:	5	MCL:	1000	MCL:	2	MCL:	10000

Sample Location:

SW-01

Sites 1 & 3
Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

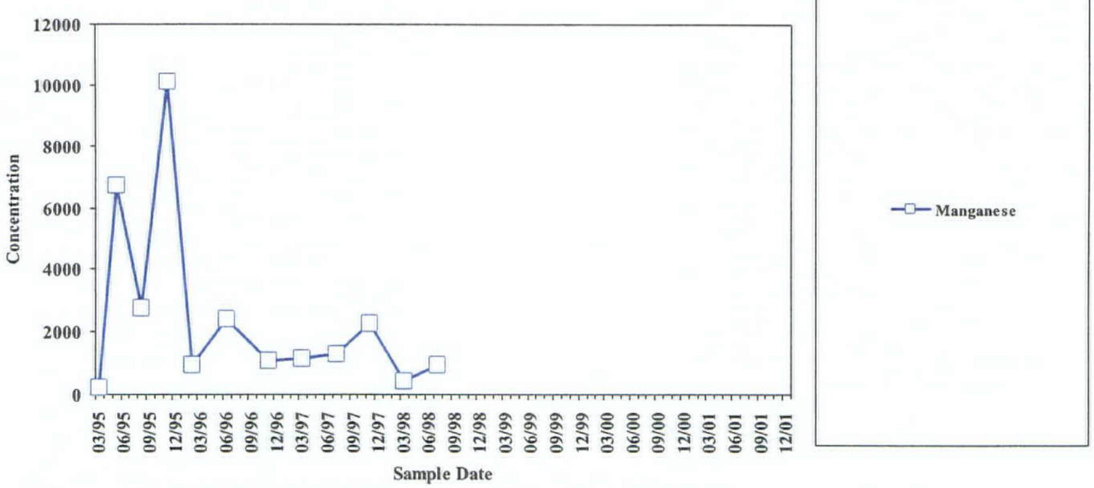
Sample concentration units: µg/L

Sample Location:

SW-01

Sites 1 & 3
Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

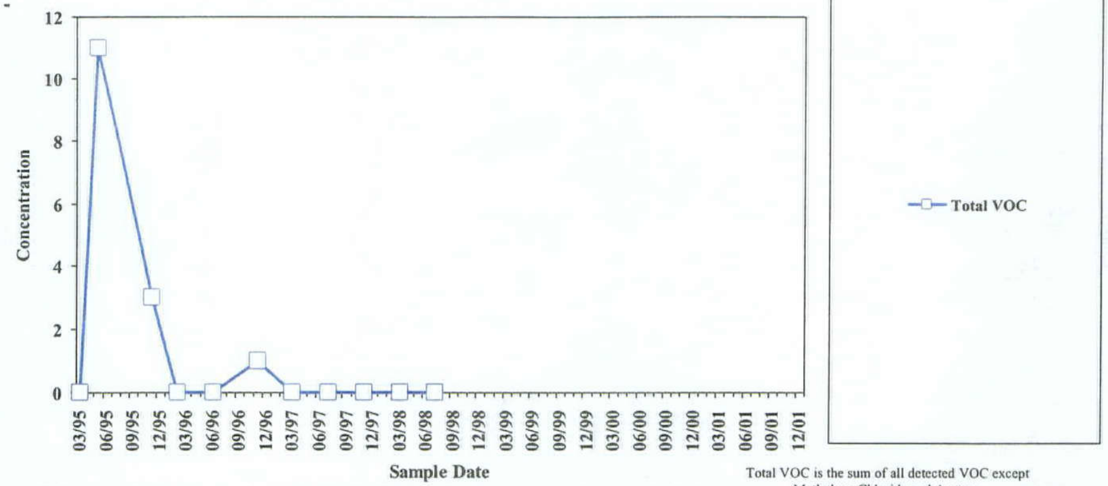
Sample Location:

SW-01

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

Figure 141 of 171

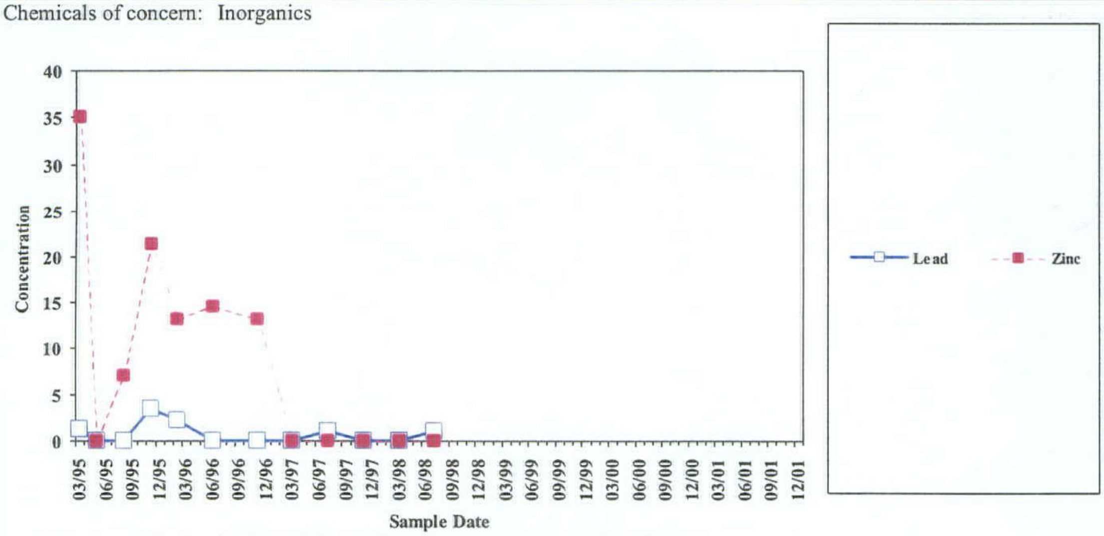
Sample Location:

SW-02

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Figure 142 of 171

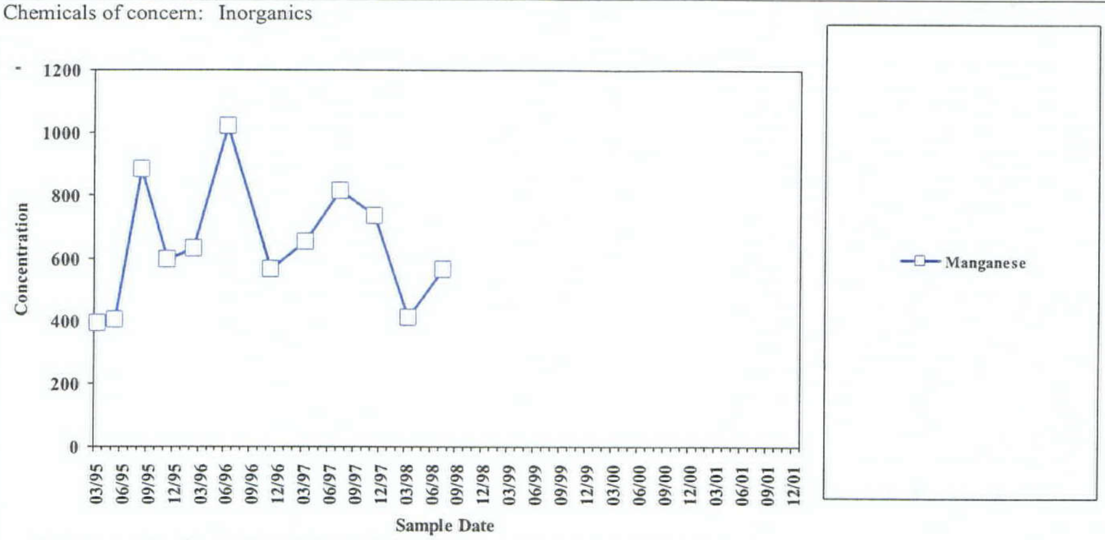
Sample Location:

SW-02

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

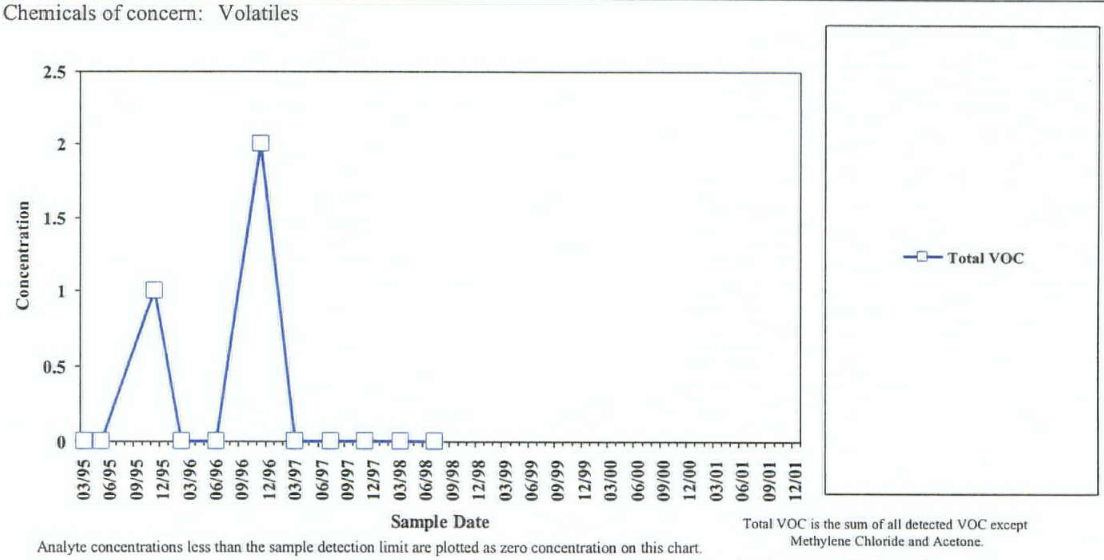
Sample Location:

SW-02

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

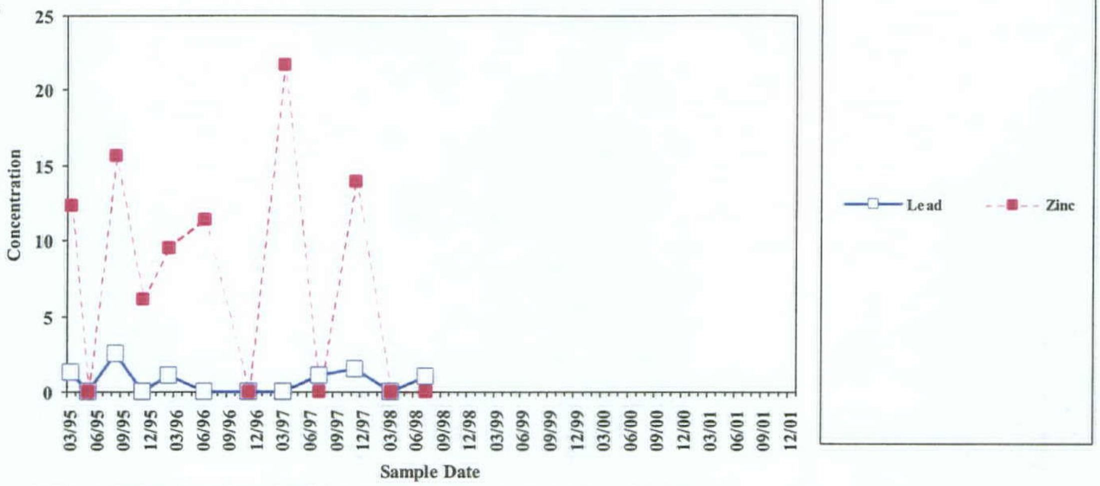
Sample concentration units: µg/L

Sample Location:

SW-03

Sites 1 & 3
Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

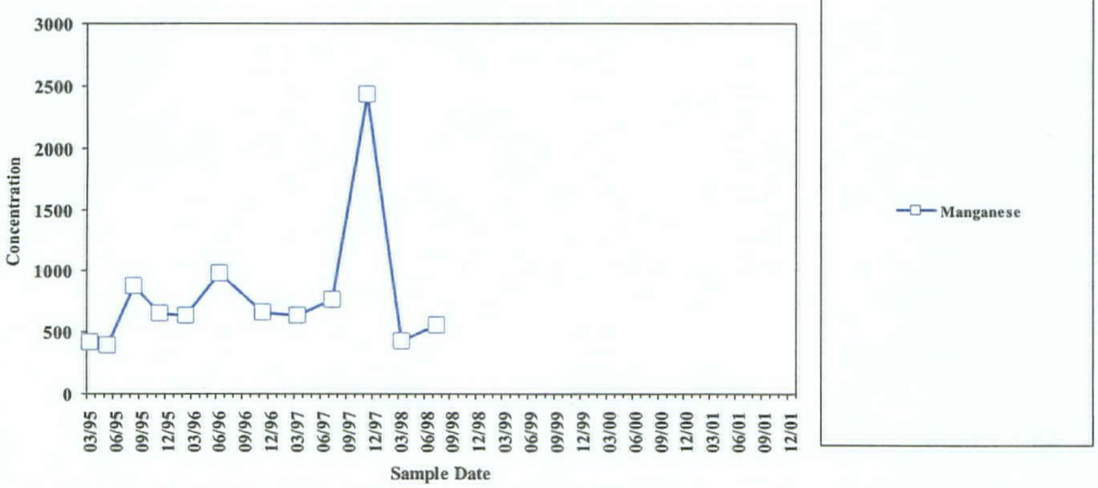
Sample concentration units: µg/L

Sample Location:

SW-03

Sites 1 & 3
Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

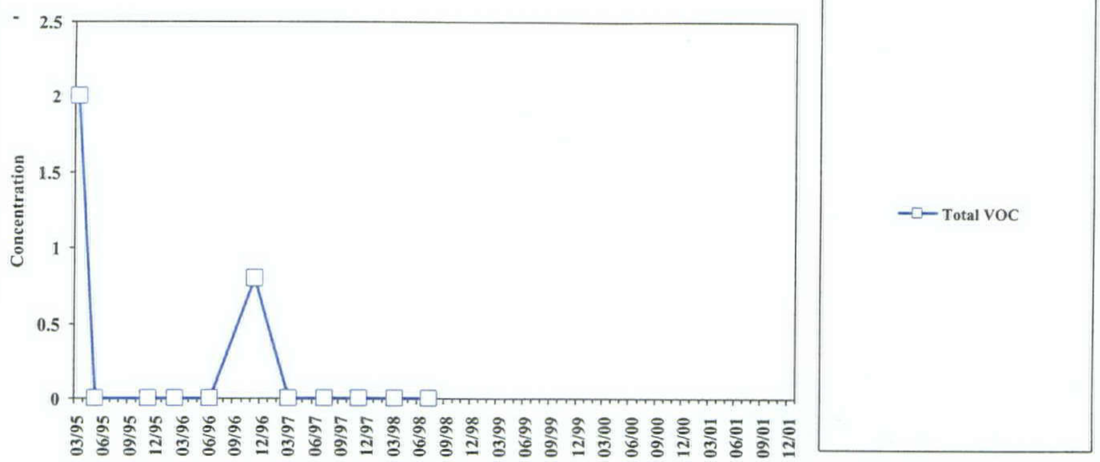
Sample concentration units: µg/L

Sample Location:

SW-03

Sites 1 & 3
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

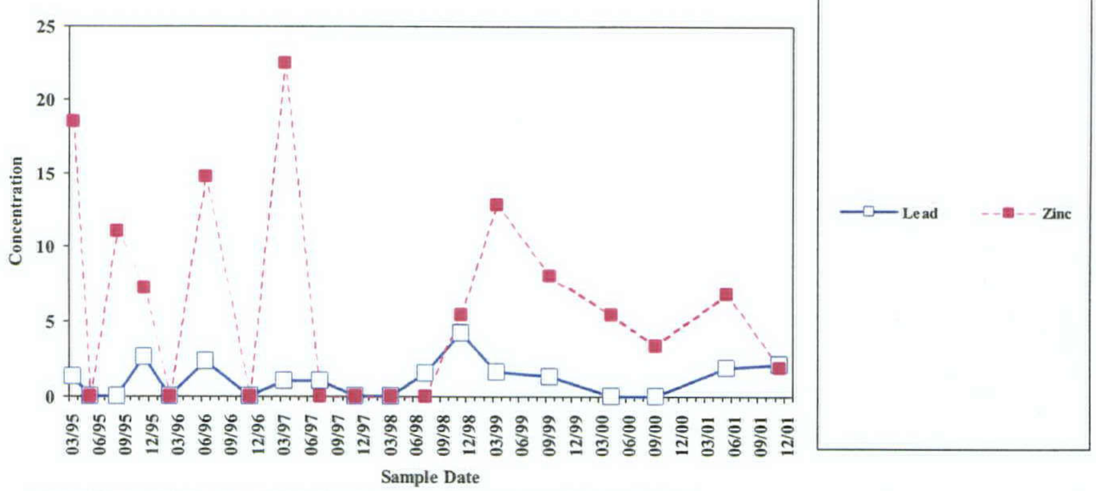
Sample concentration units: µg/L

Sample Location:

SW-04

Sites 1 & 3
Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

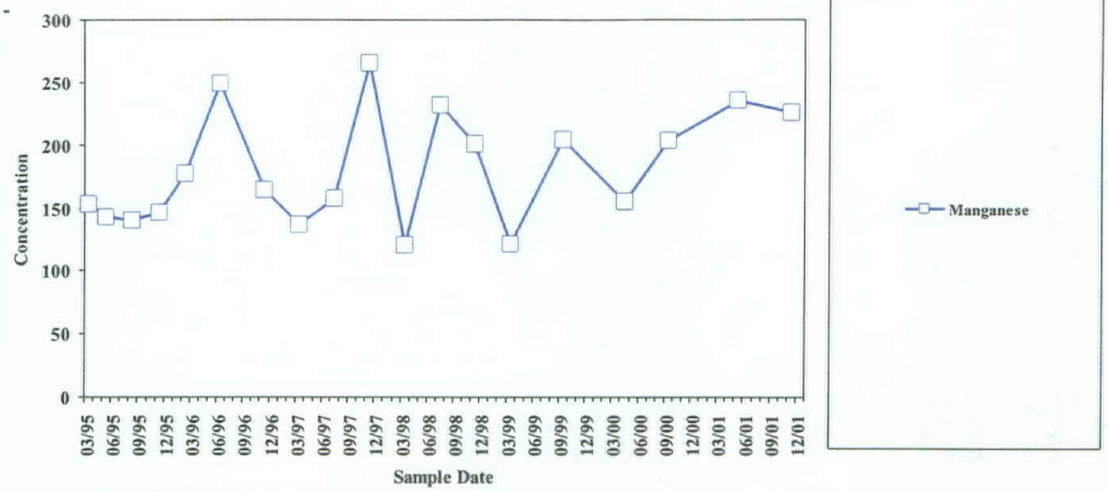
Sample Location:

SW-04

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

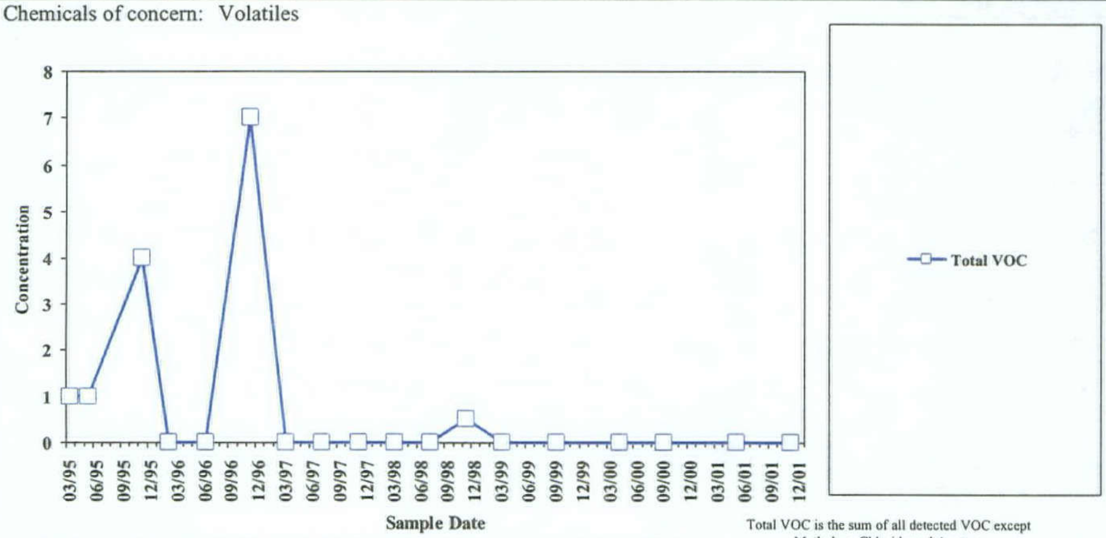
Sample Location:

SW-04

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

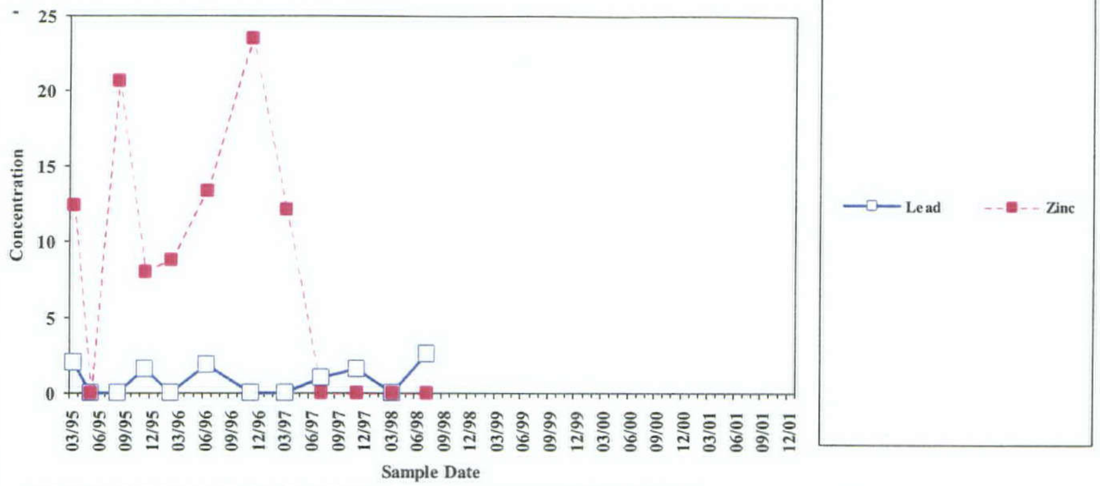
Sample Location:

SW-05

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

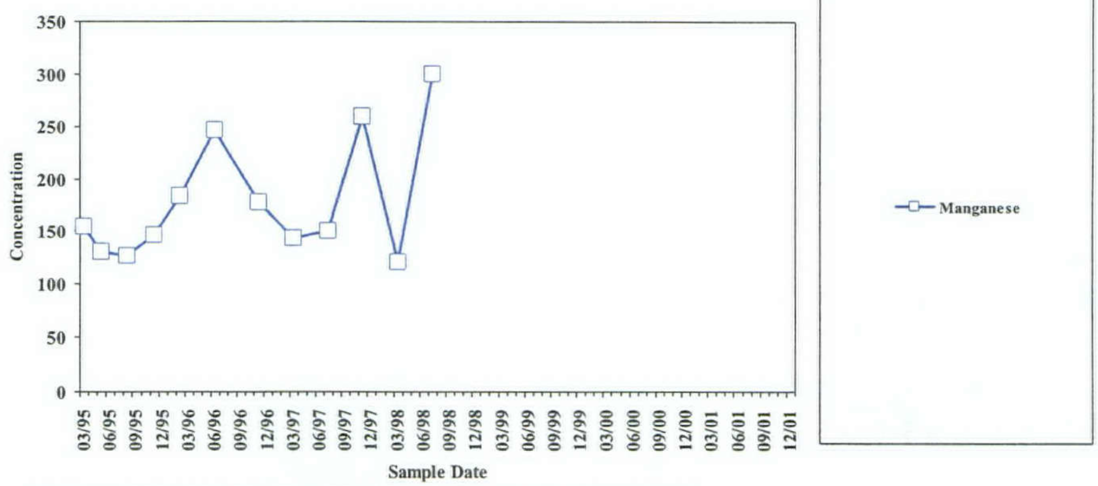
Sample Location:

SW-05

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

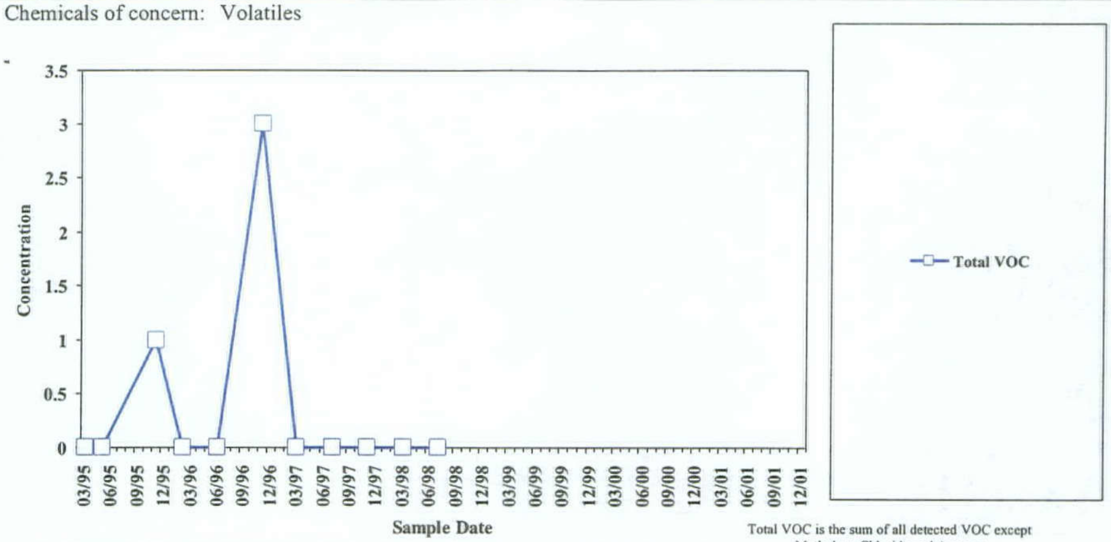
Sample Location:

SW-05

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

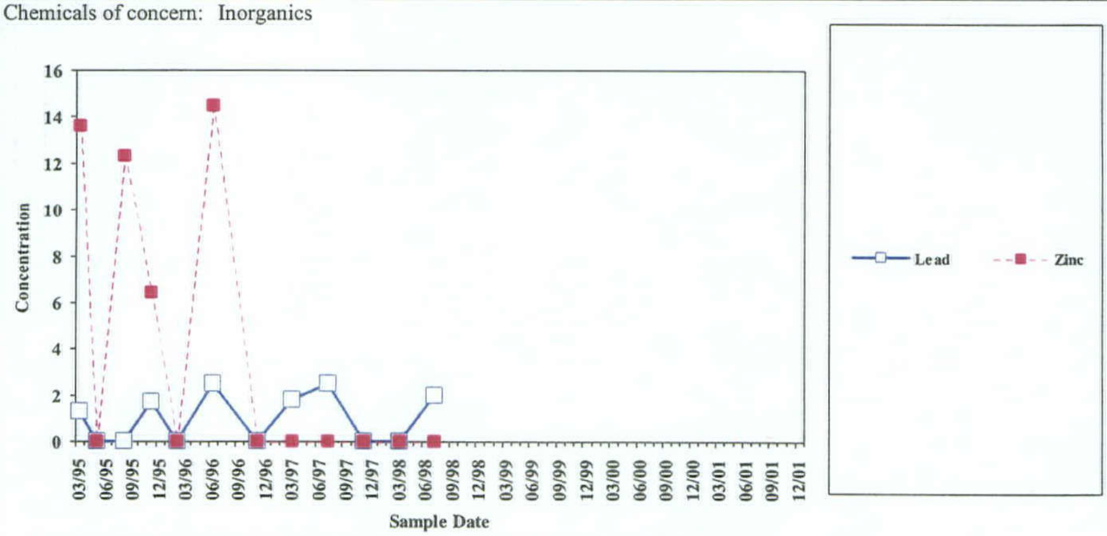
Sample Location:

SW-06

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

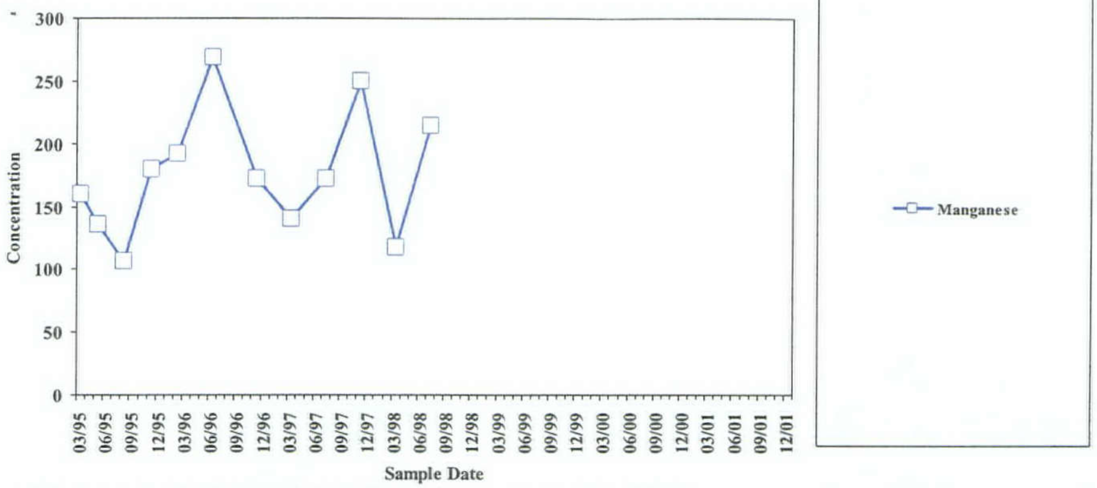
Sample Location:

SW-06

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

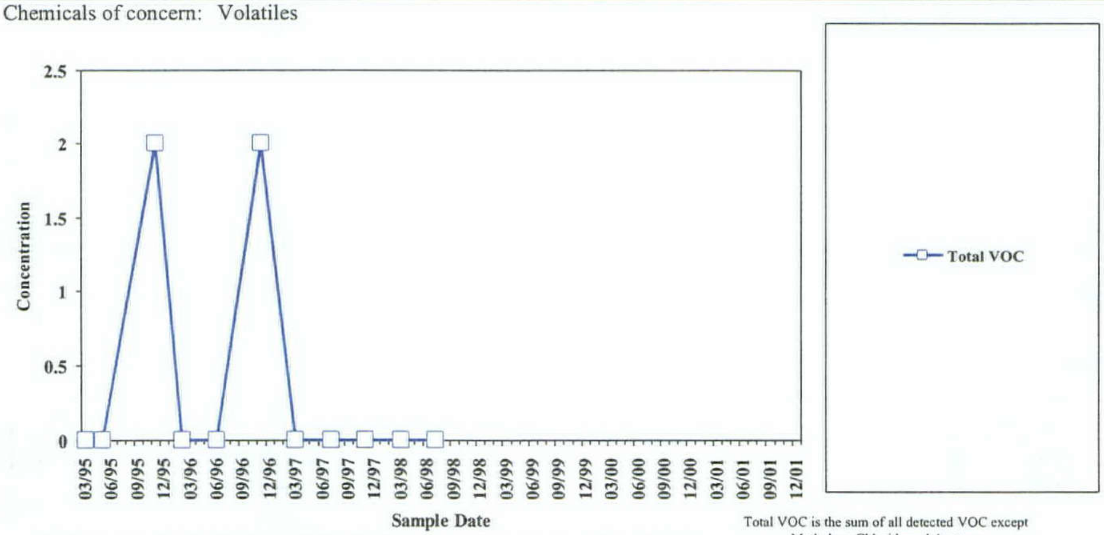
Sample Location:

SW-06

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

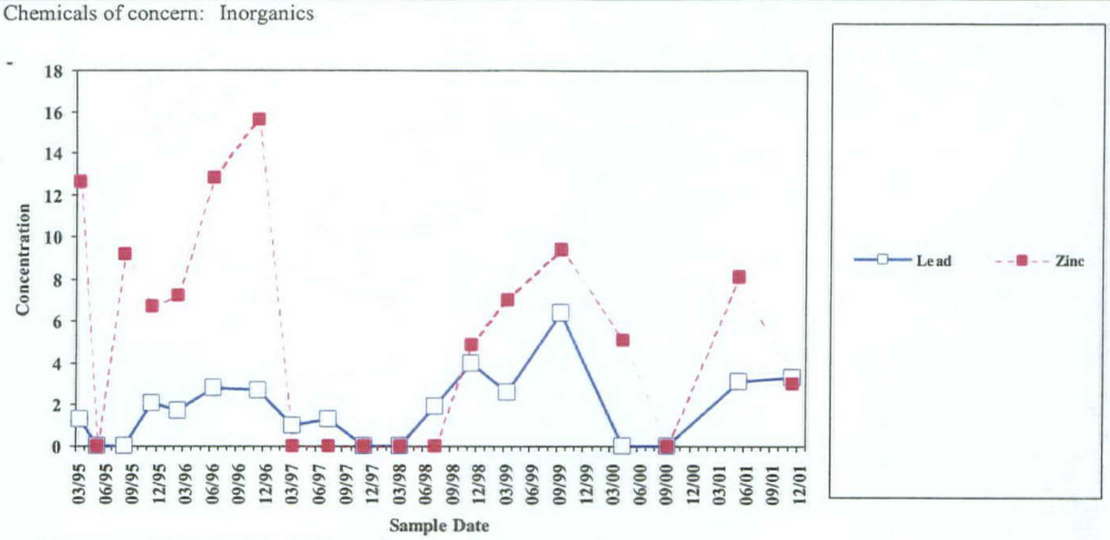
Sample Location:

SW-07

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

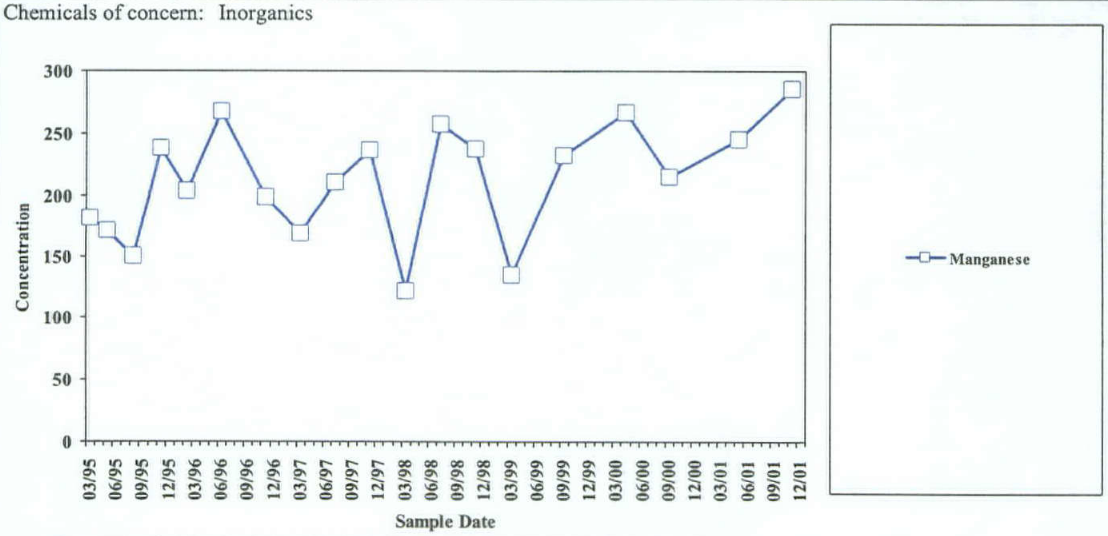
Sample Location:

SW-07

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

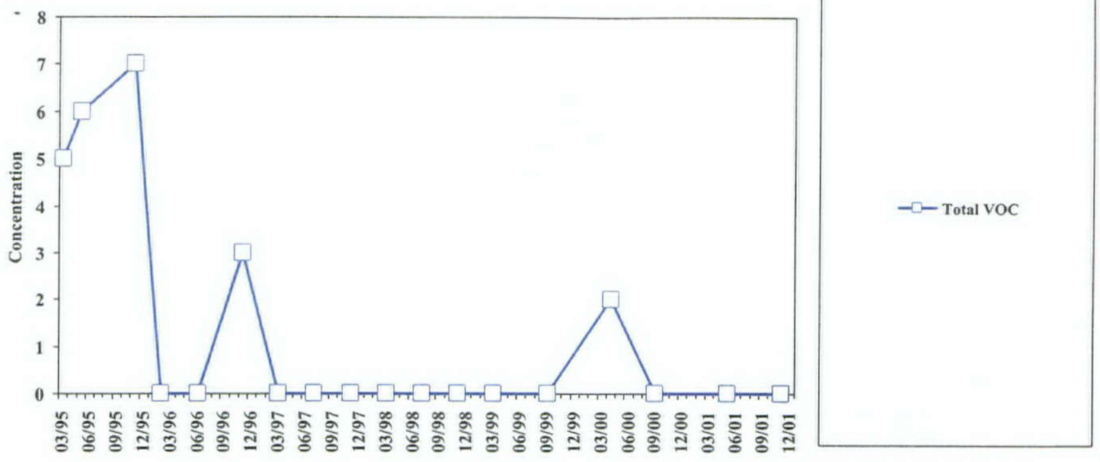
Sample Location:

SW-07

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

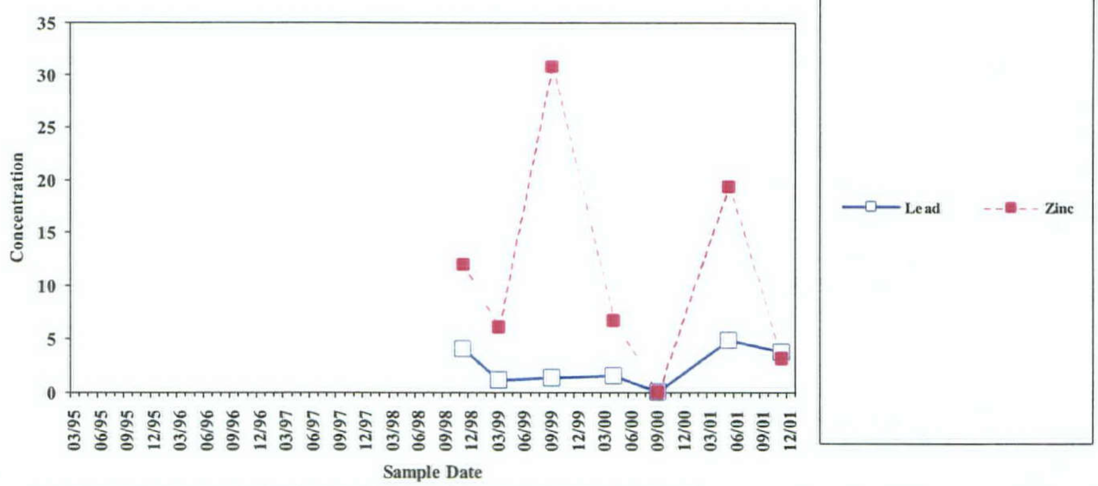
Sample Location:

SW-08

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

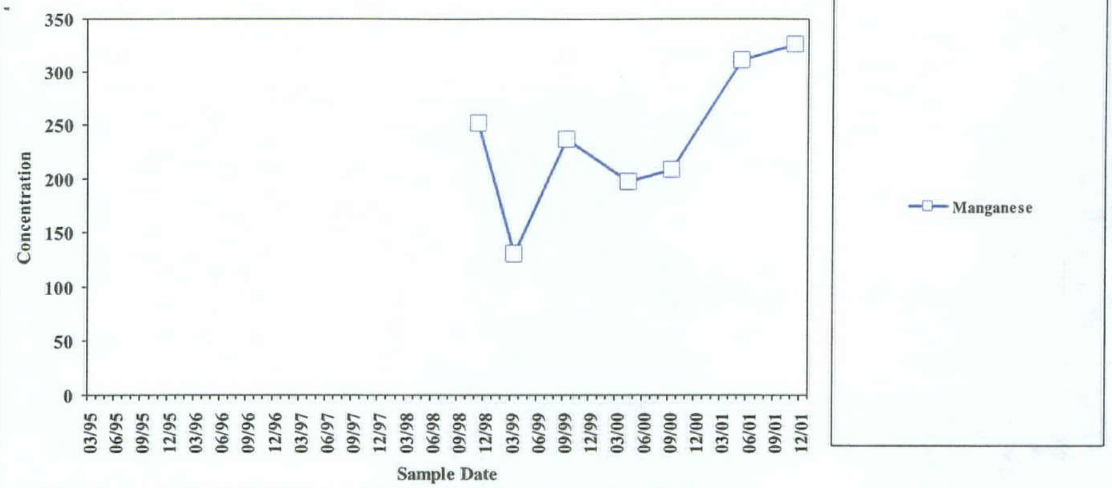
Sample Location:

SW-08

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

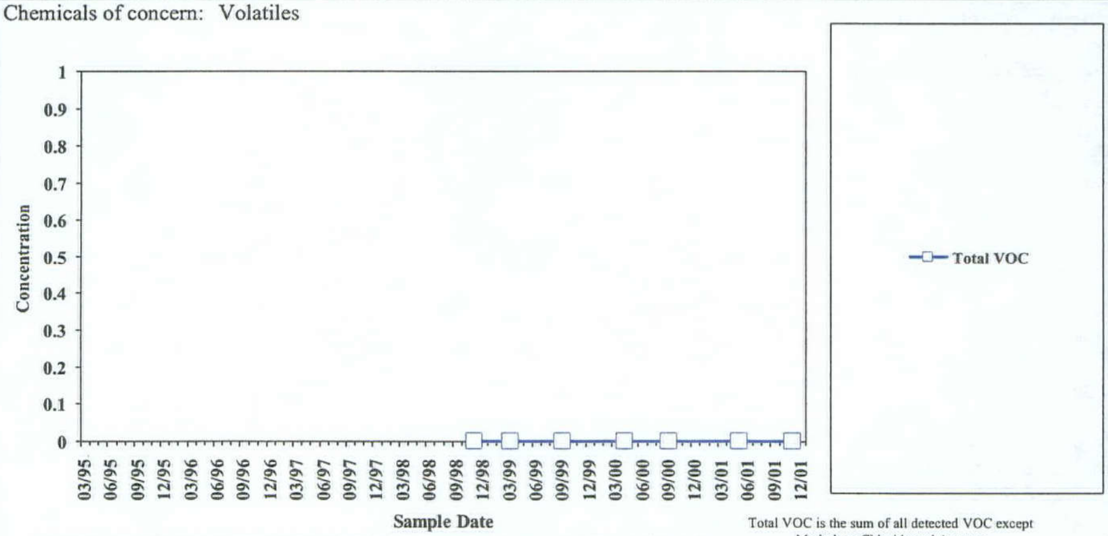
Sample Location:

SW-08

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

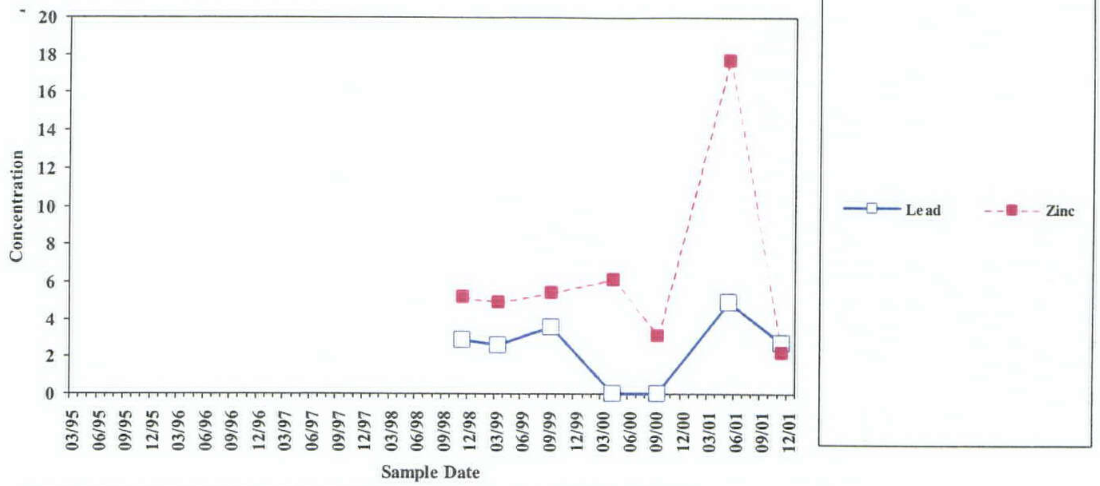
Sample concentration units: µg/L

Sample Location:

SW-09

Sites 1 & 3
Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

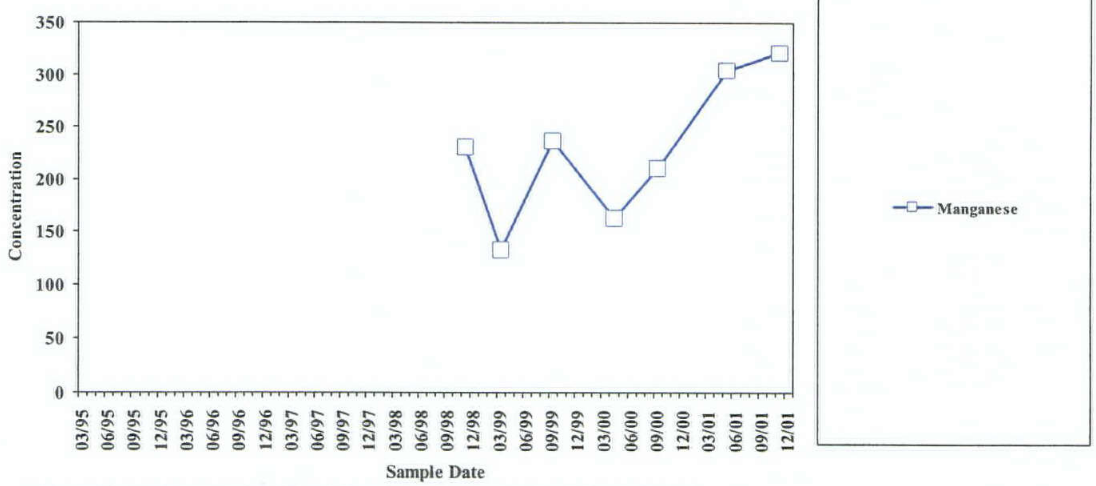
Sample concentration units: µg/L

Sample Location:

SW-09

Sites 1 & 3
Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

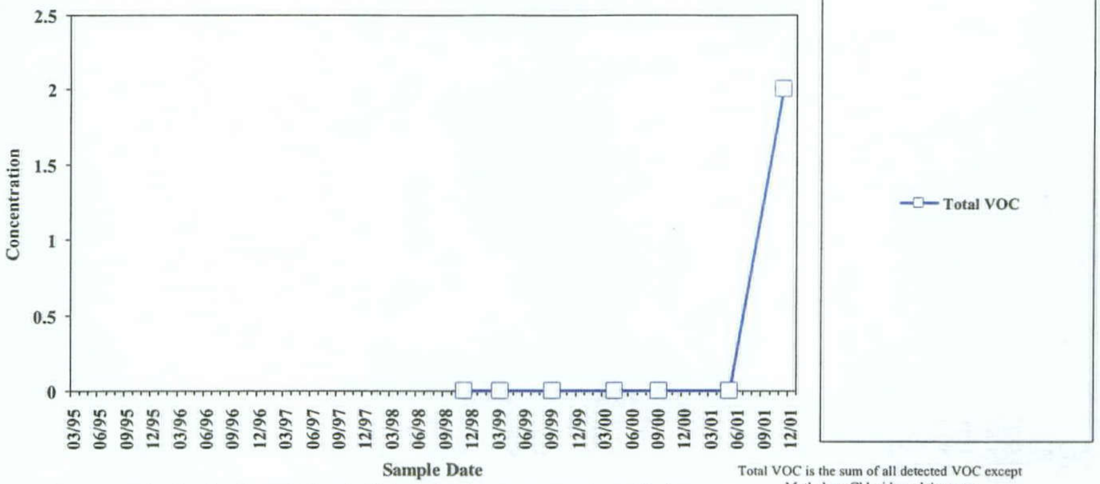
Sample Location:

SW-09

Sites 1 & 3

Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

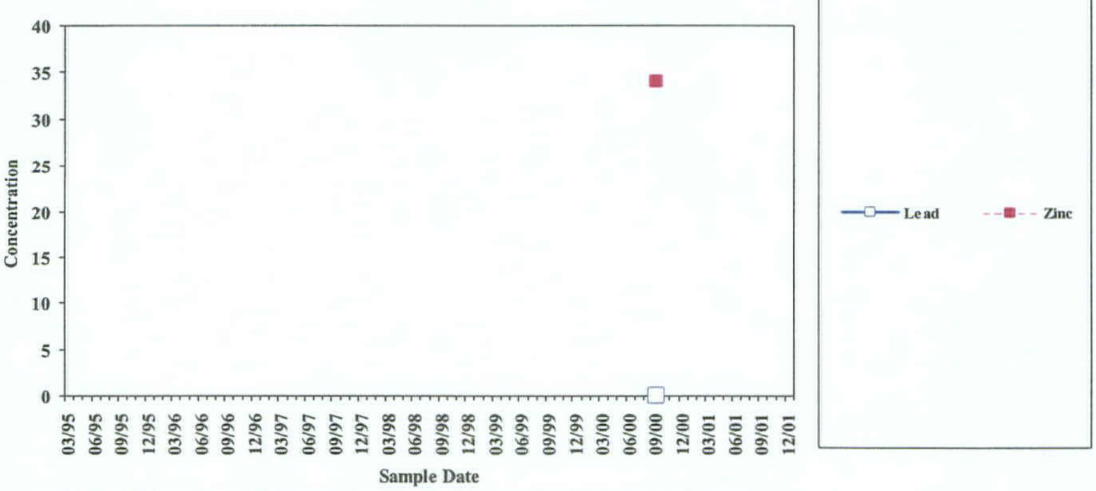
Sample Location:

SW-15

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

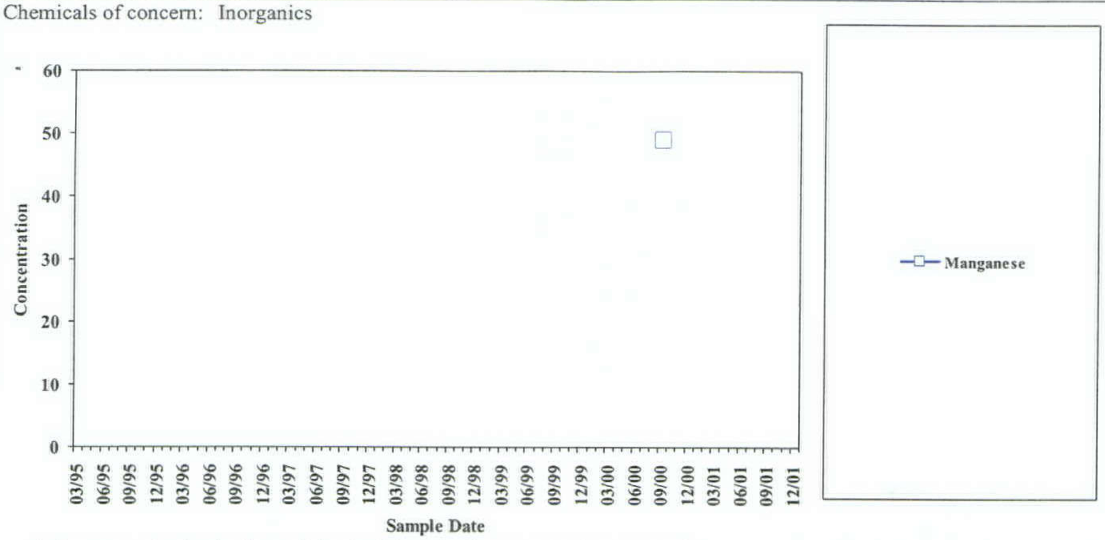
Sample Location:

SW-15

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

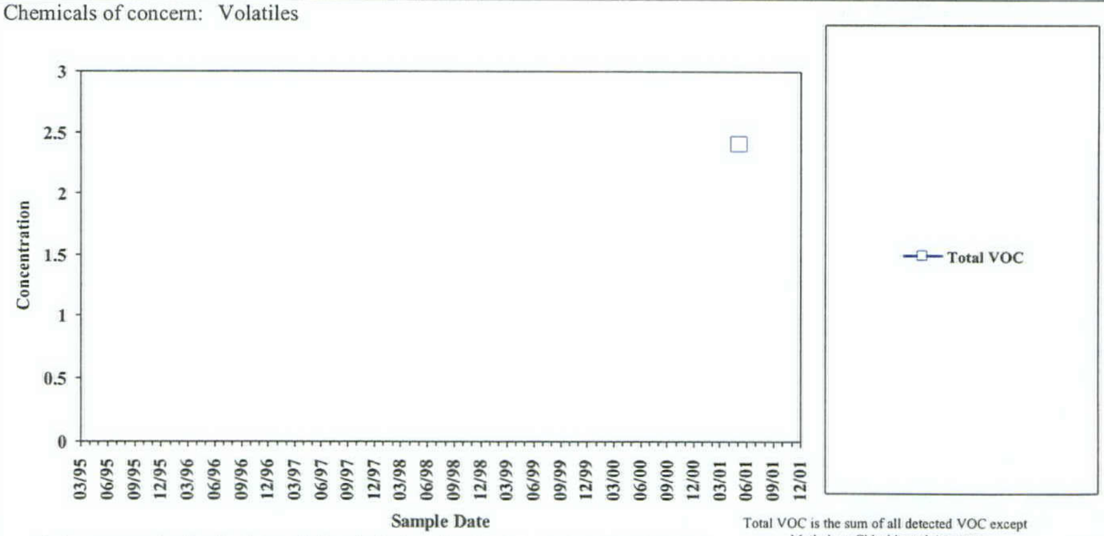
Sample Location:

SW-15

Sites 1 & 3

Surface water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

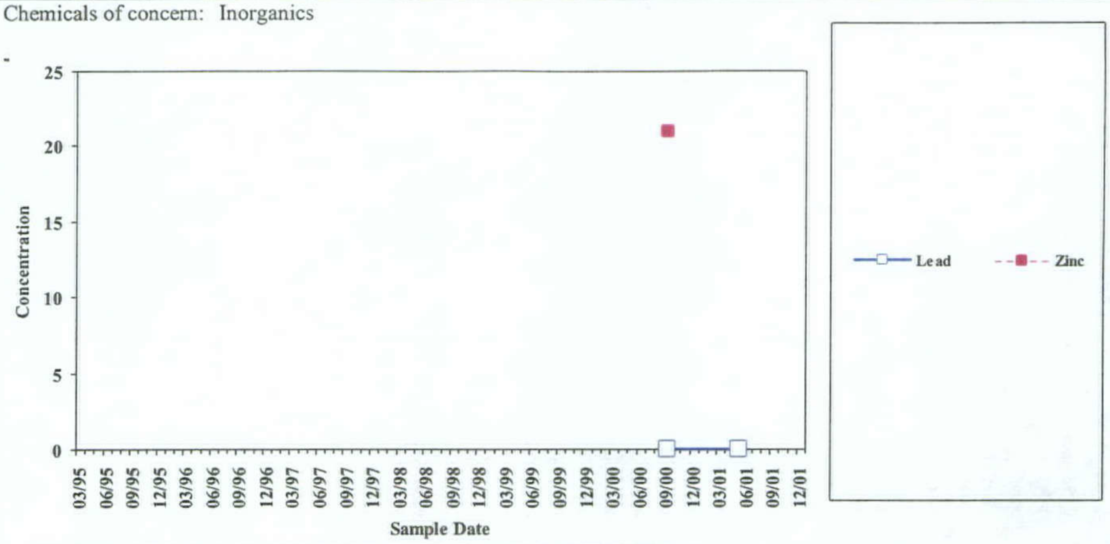
Sample Location:

SW-16

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Figure 169 of 171

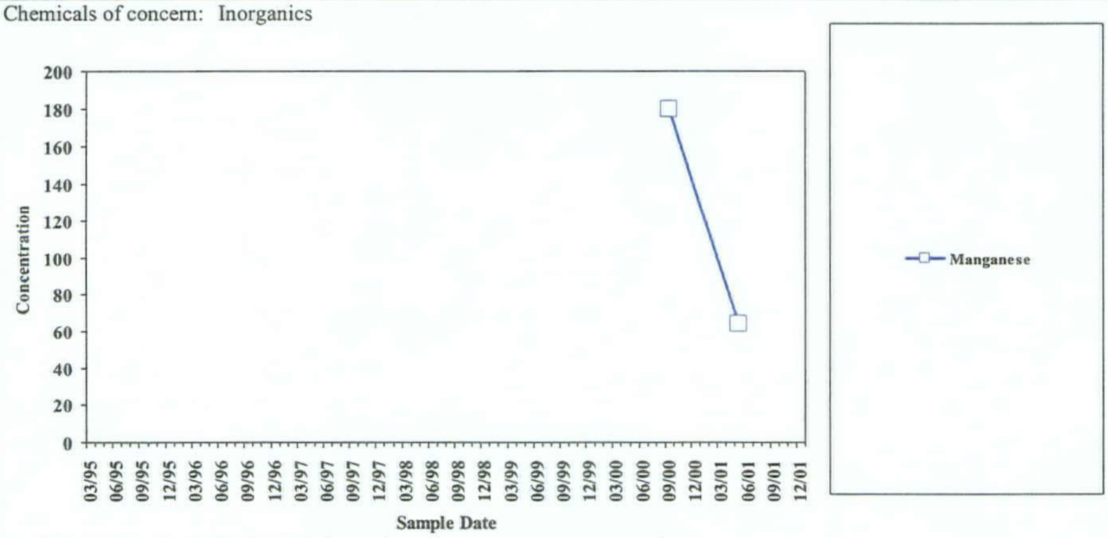
Sample Location:

SW-16

Sites 1 & 3

Surface Water

Chemicals of concern: Inorganics



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

Figure 170 of 171

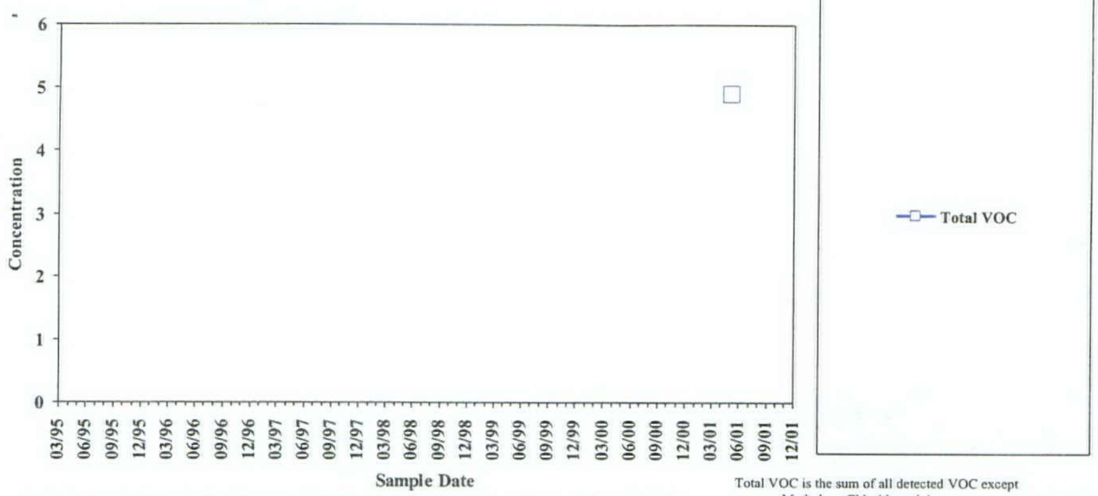
Sample Location:

SW-16

Sites 1 & 3

Surface water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

Appendix B.4

Long-Term Monitoring Trend Results
Eastern Plume

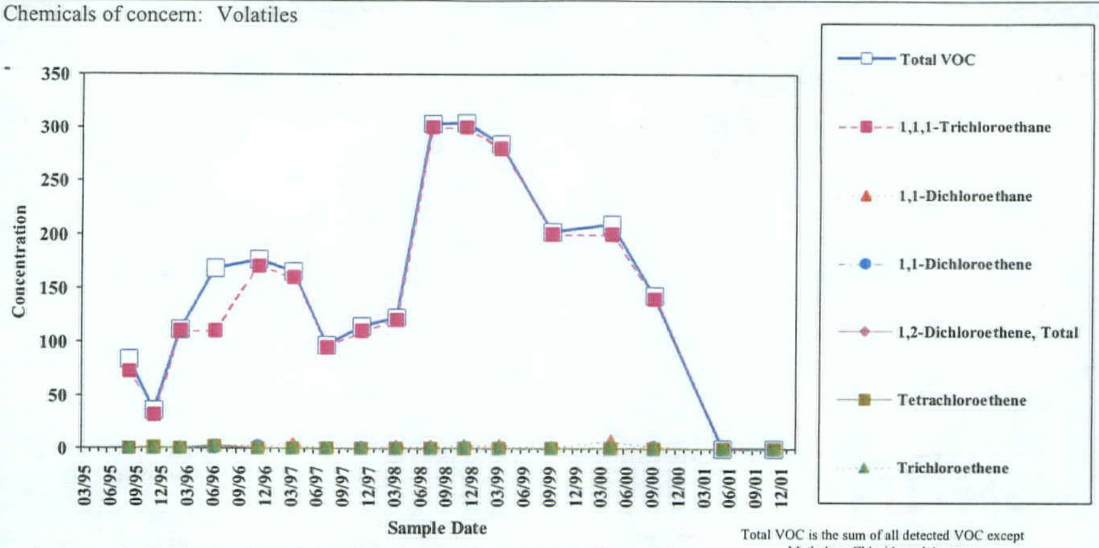
- **Extraction System Influent/Effluent and Extraction Well Data (EW)**
- **Groundwater Data (MW)**

Sample Location:

Eastern Plume Combined Effluent

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

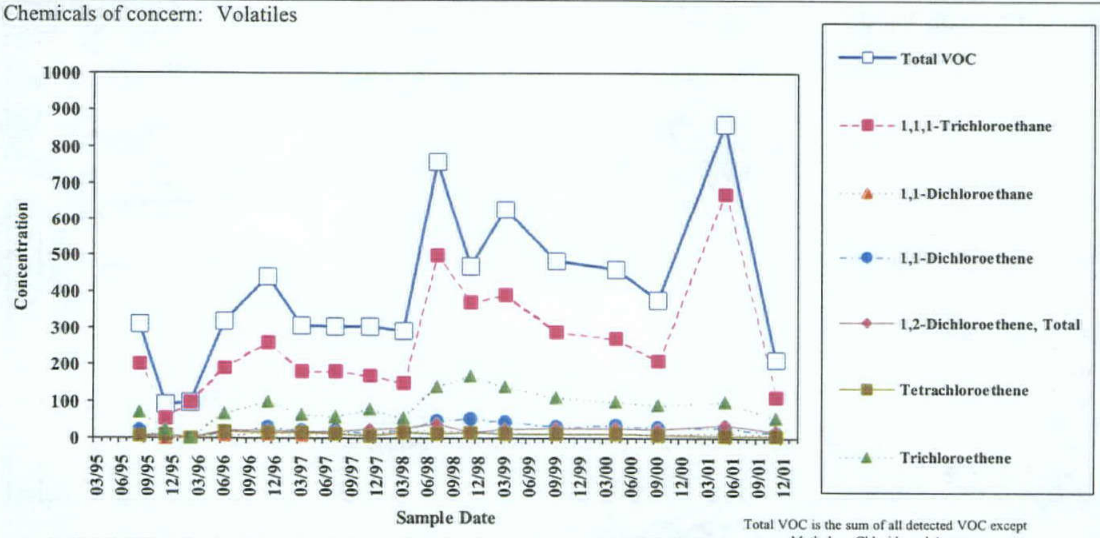
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

Eastern Plume Raw Influent

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

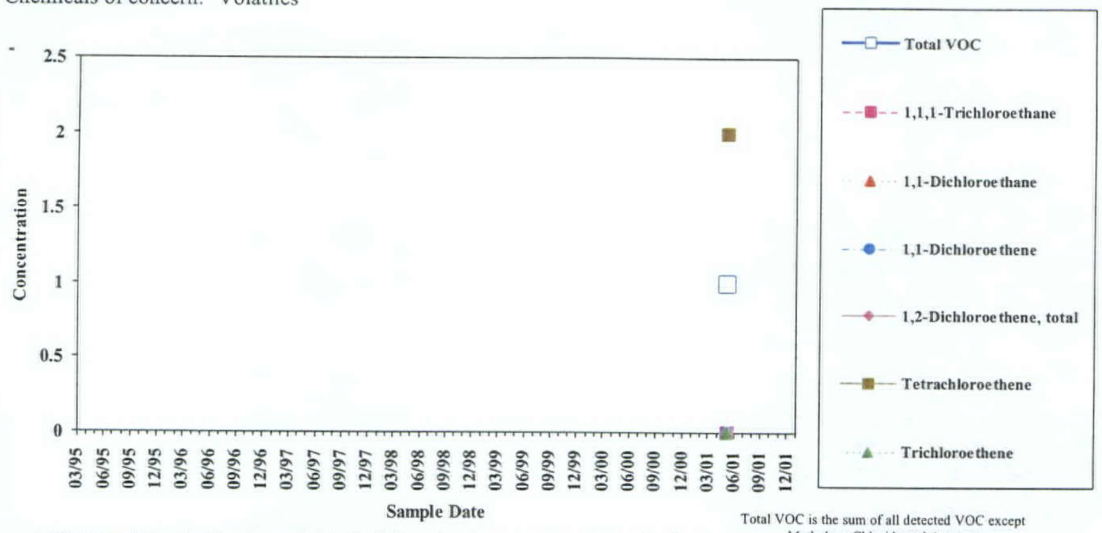
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-01

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

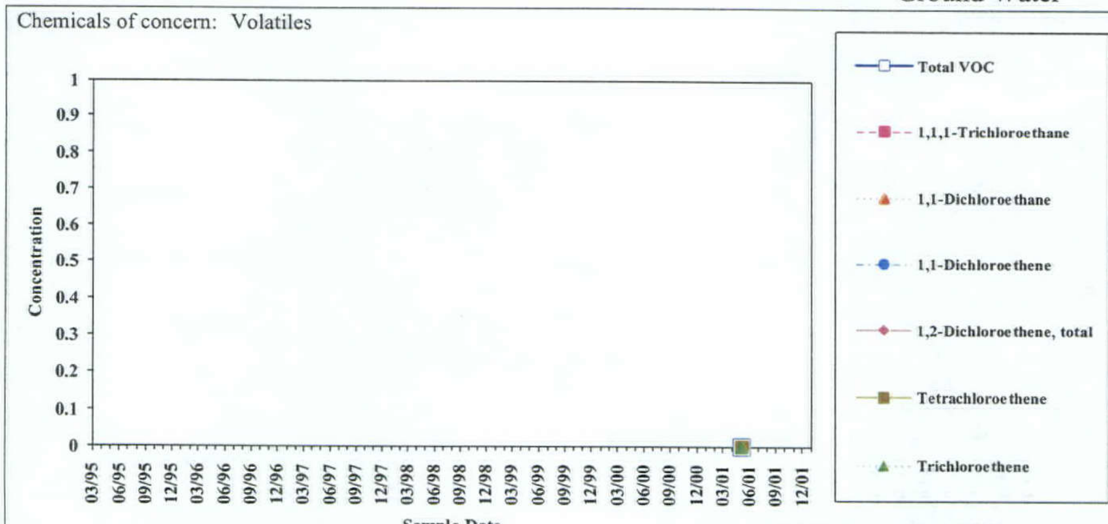
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-02

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

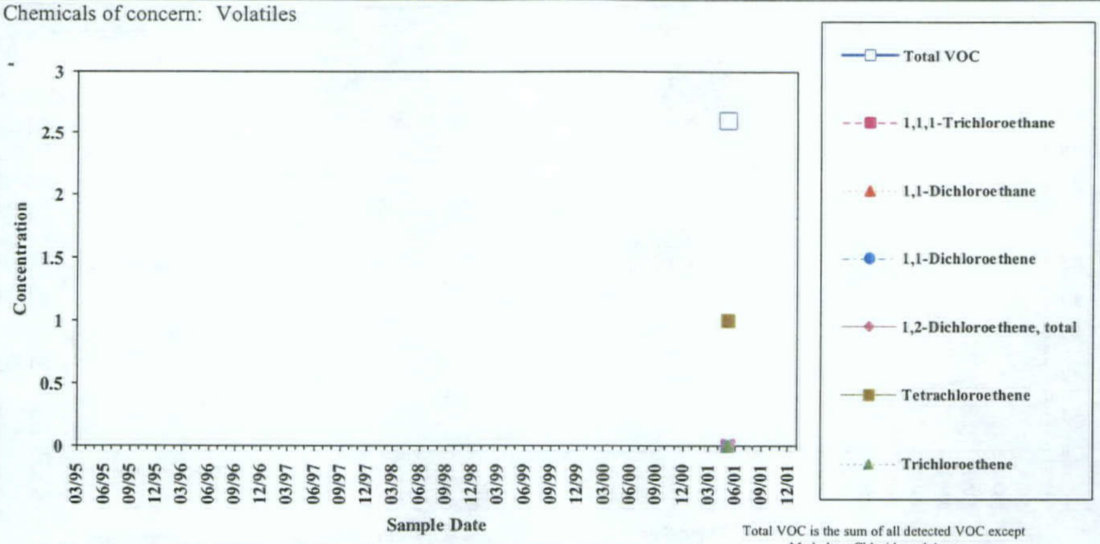
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-03

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

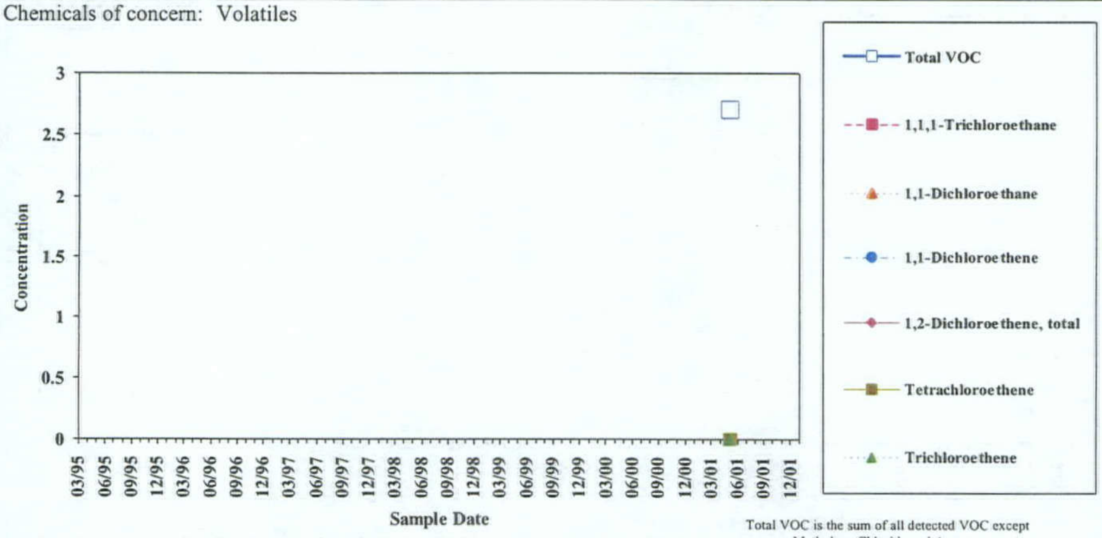
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-04

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

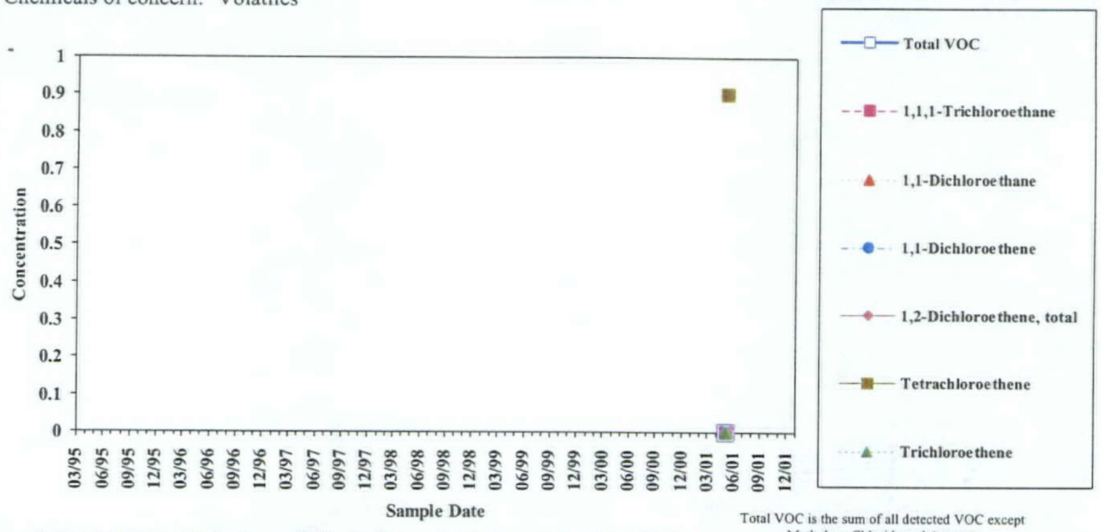
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-05

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

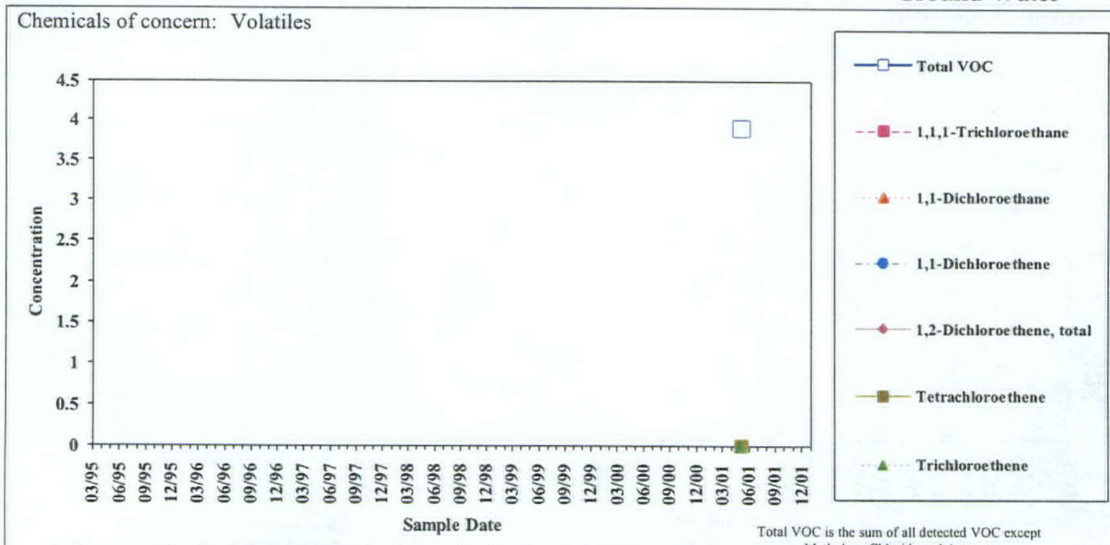
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-06

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

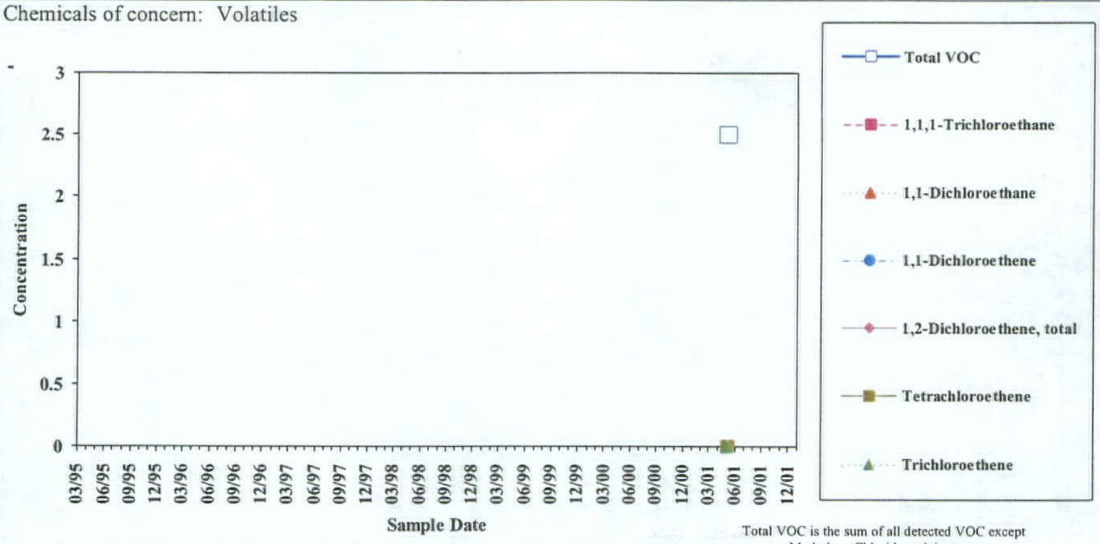
Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:
EP-DP-07

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

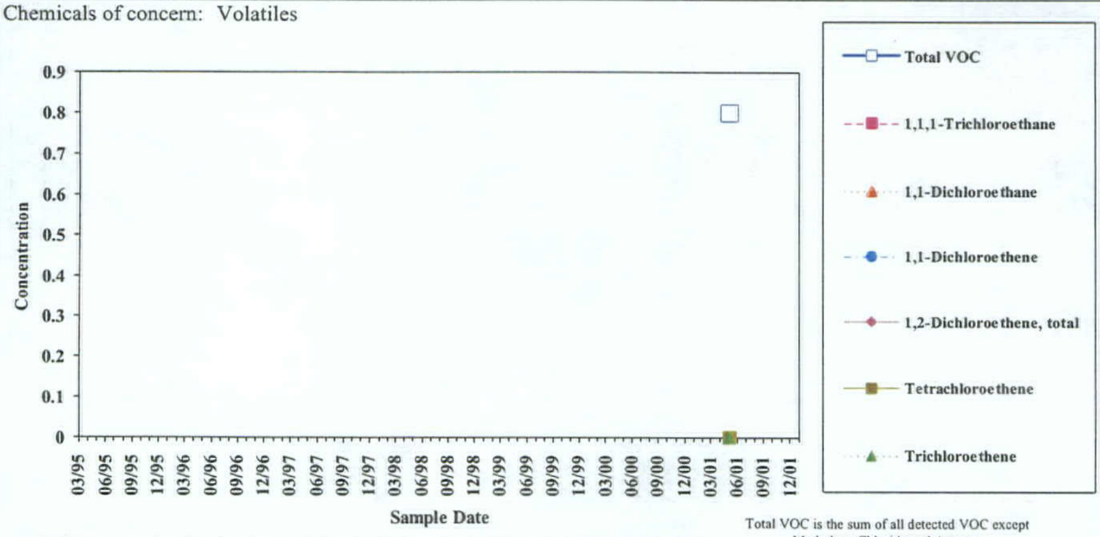
Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:
EP-DP-09

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

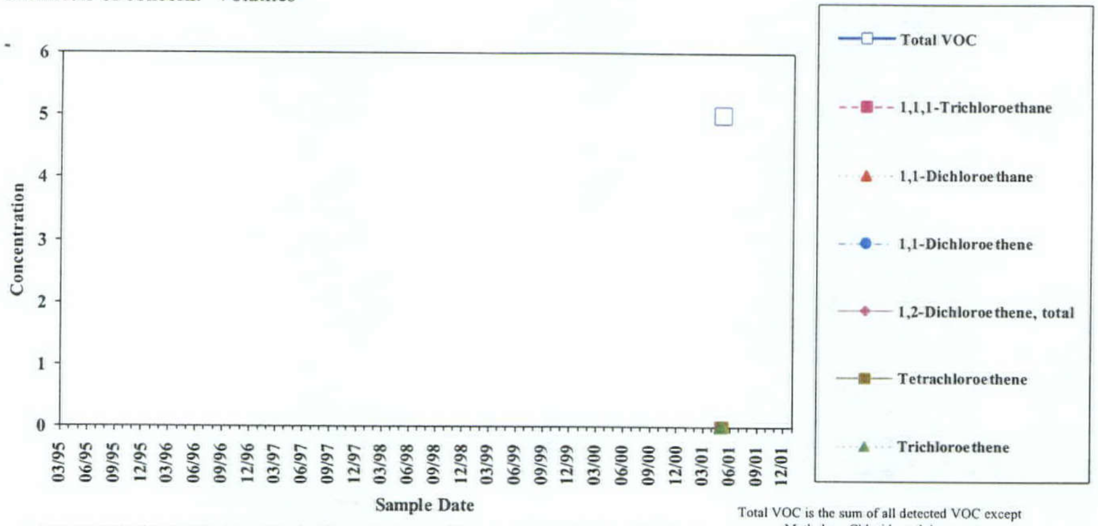
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-10

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

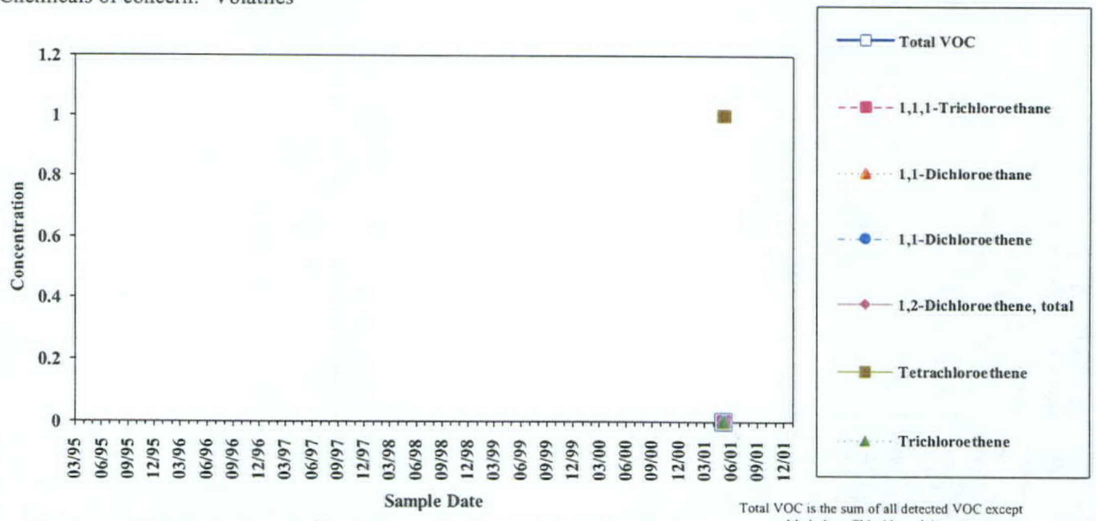
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-11

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

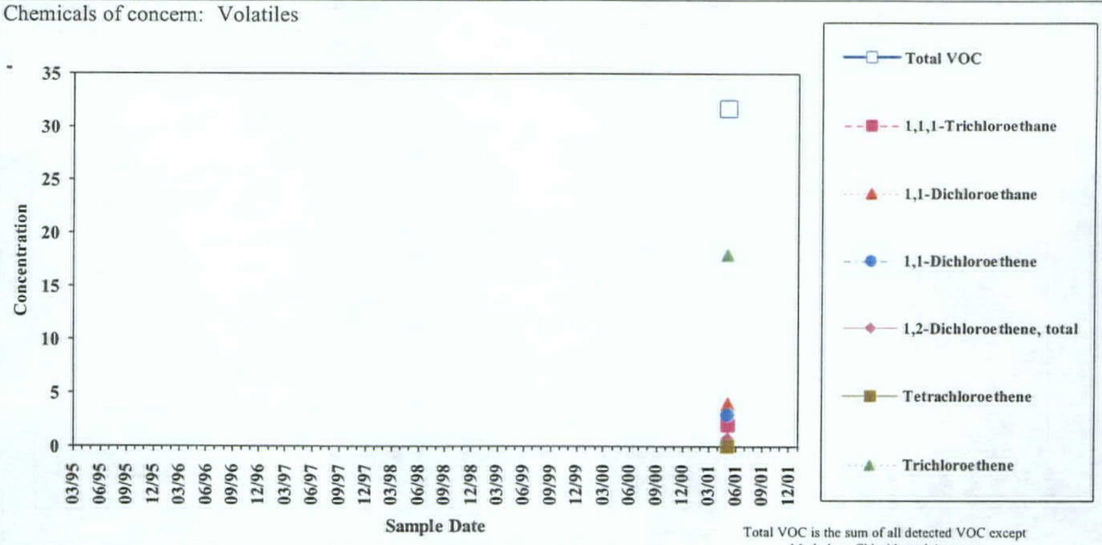
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-12

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

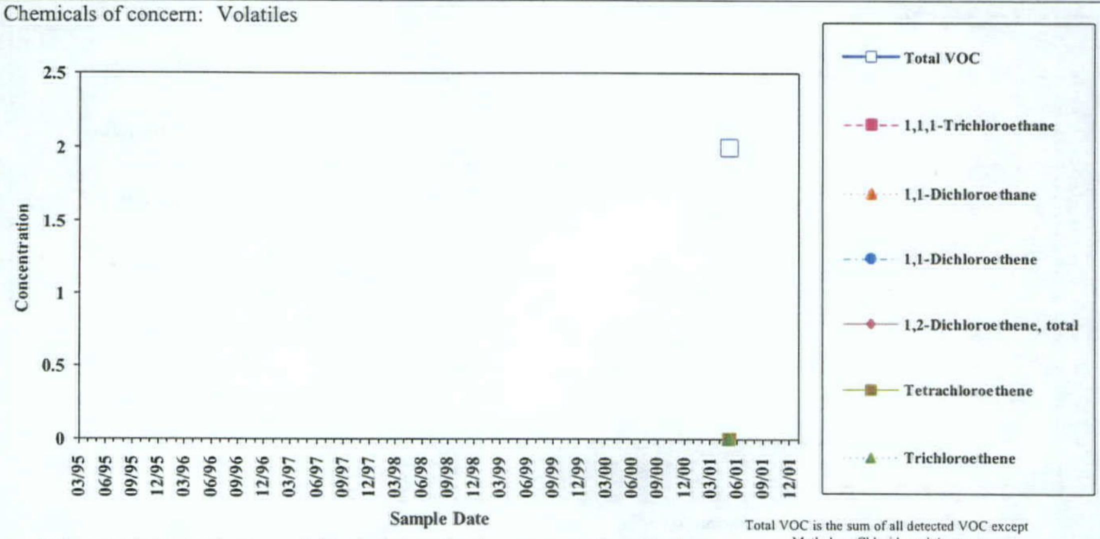
Figure 13 of 86

Sample Location:

EP-DP-13

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

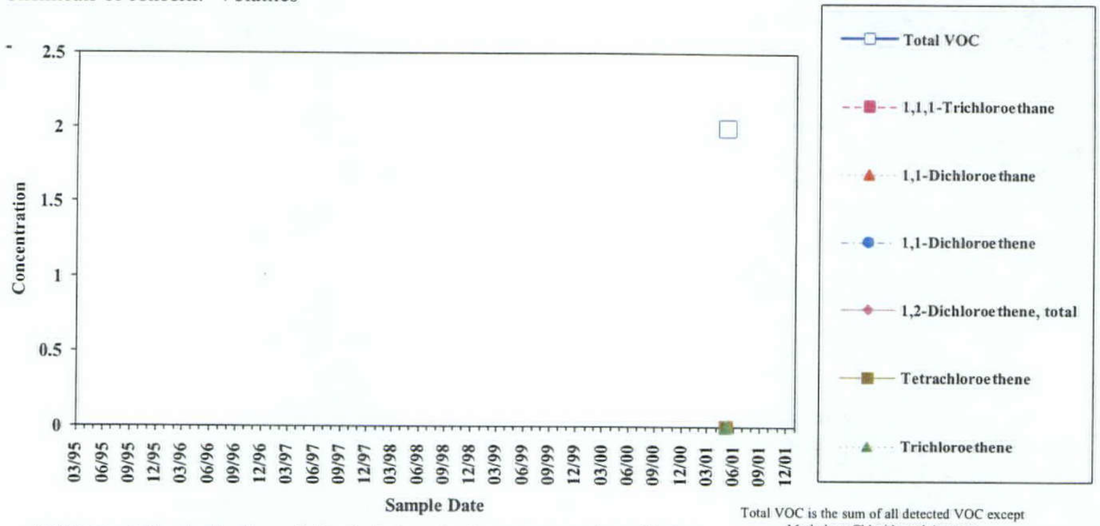
Figure 14 of 86

Sample Location:

EP-DP-14

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

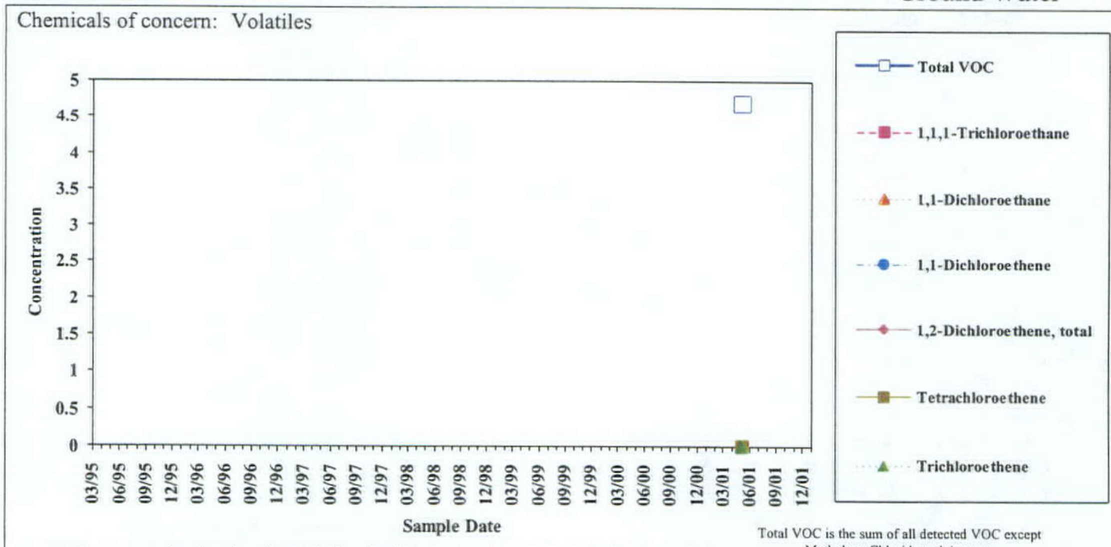
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-15

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

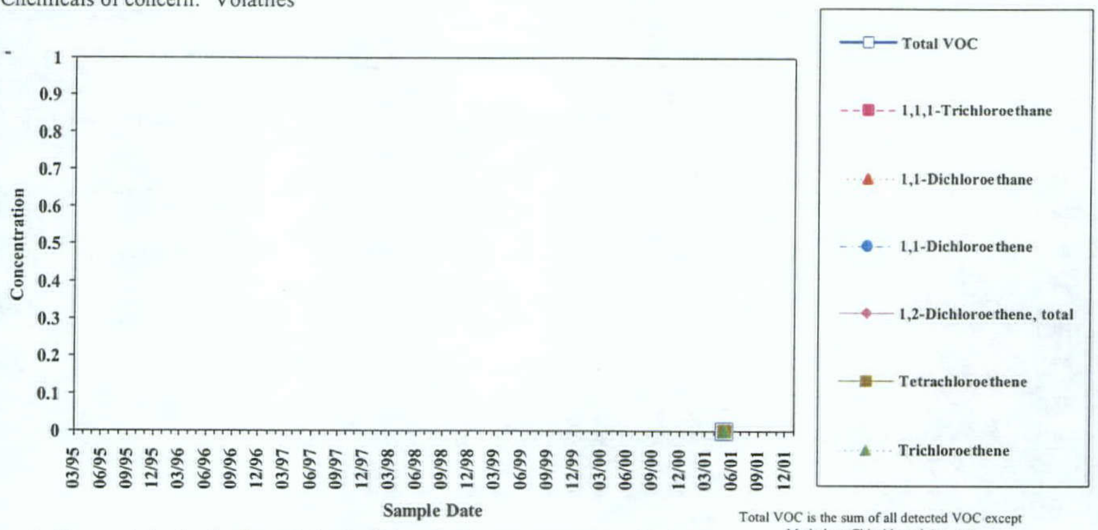
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-16

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

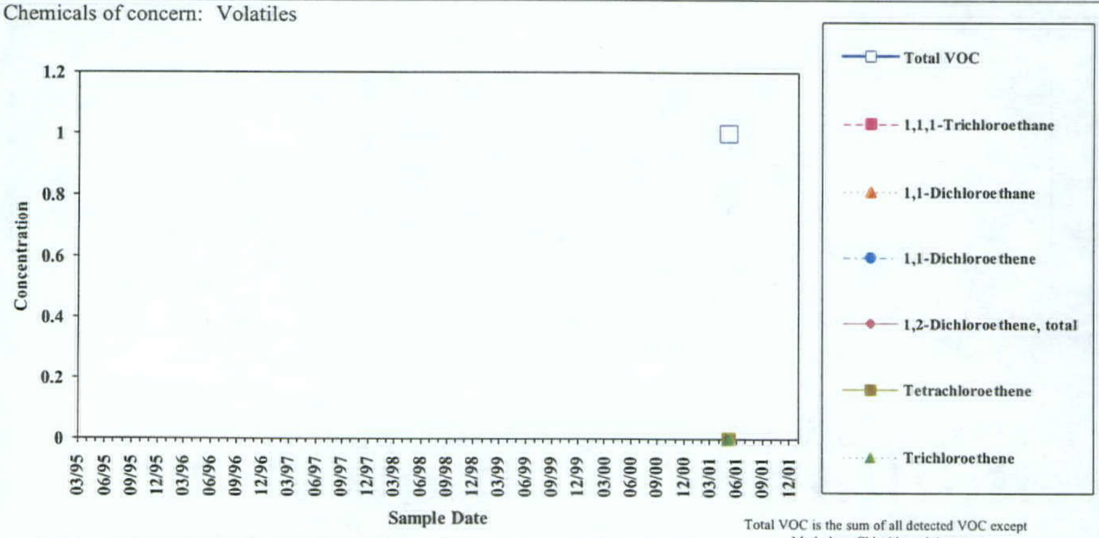
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EP-DP-18

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

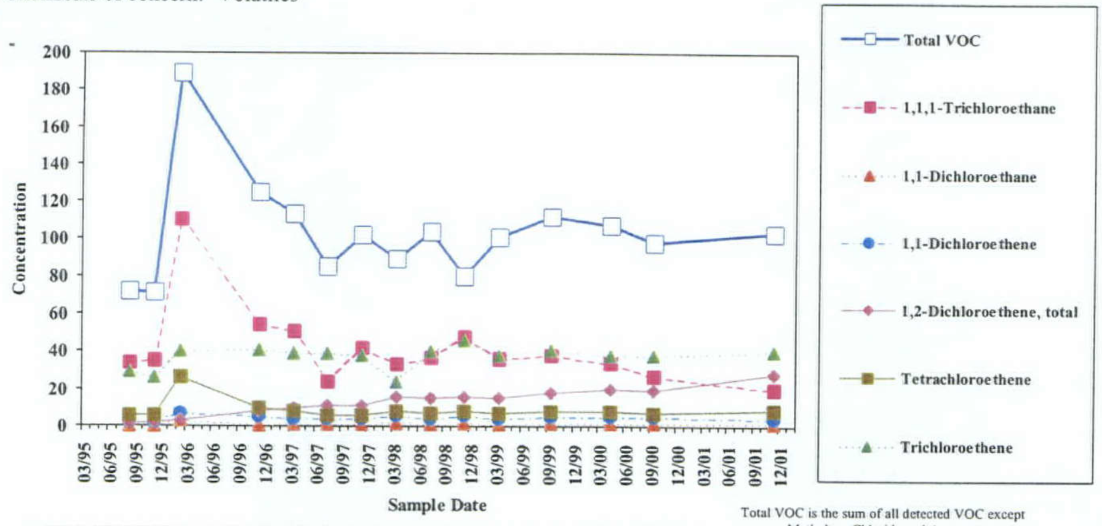
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EW-01

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

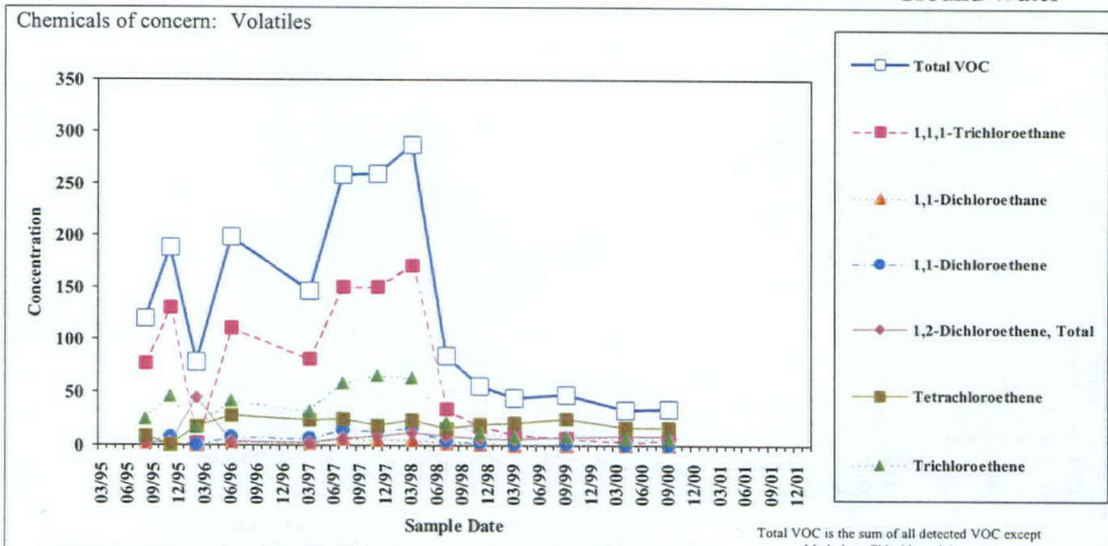
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EW-02

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

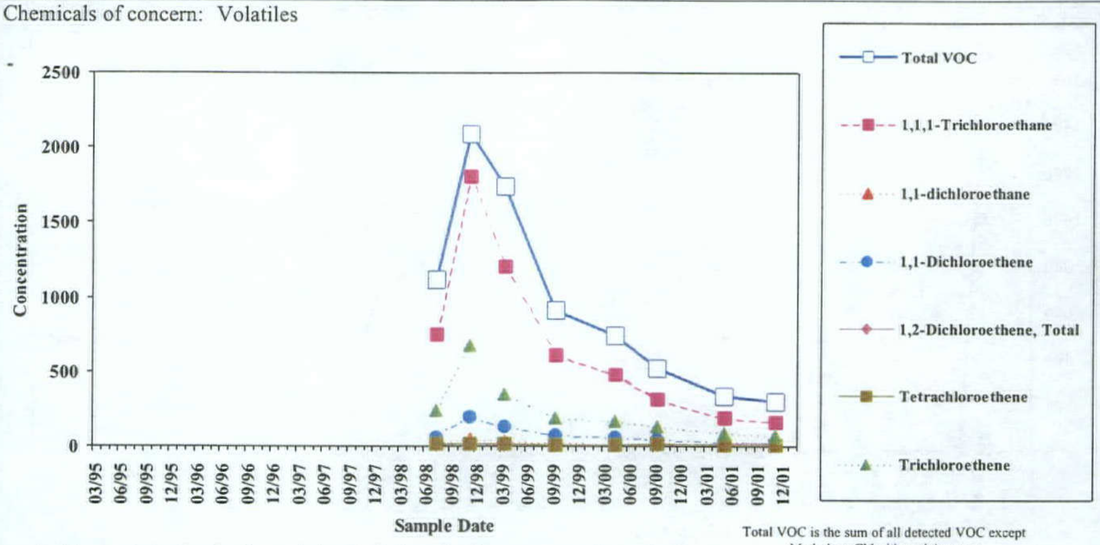
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EW-02A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

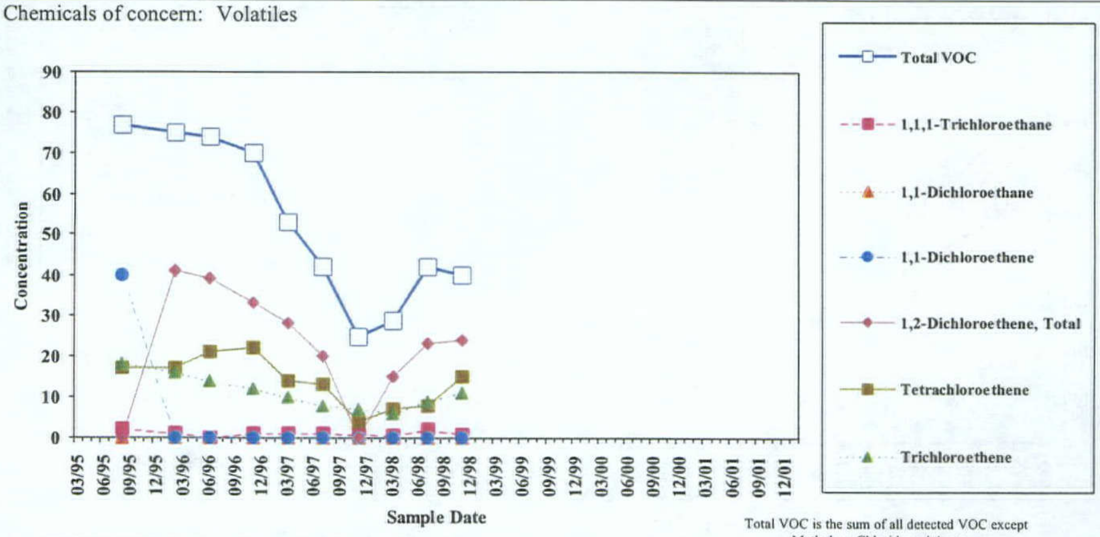
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EW-03

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

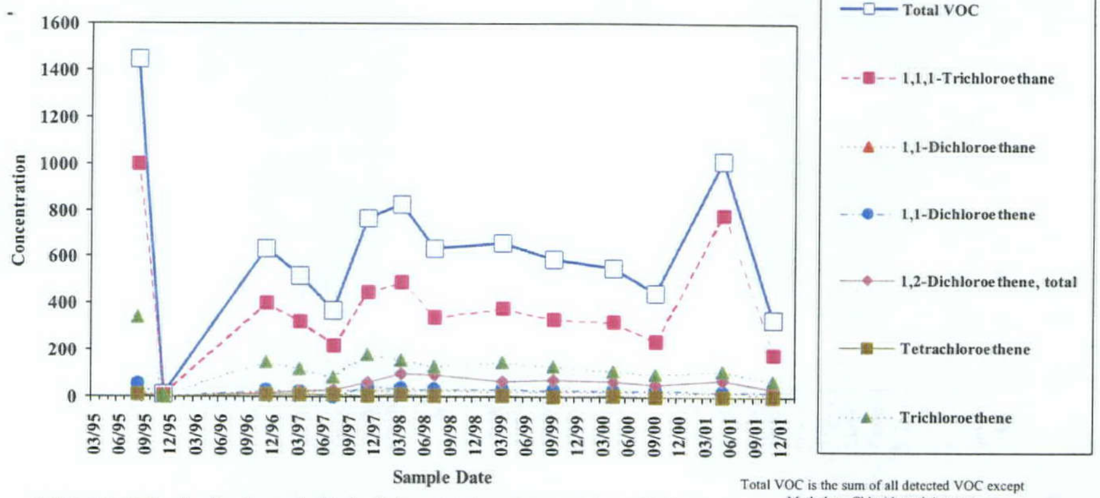
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EW-04

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

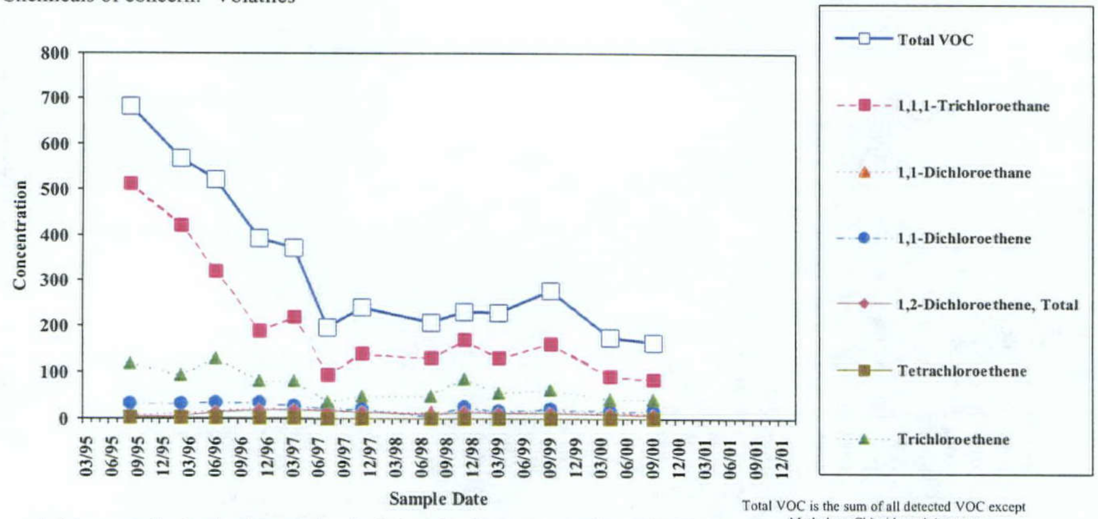
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EW-05

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

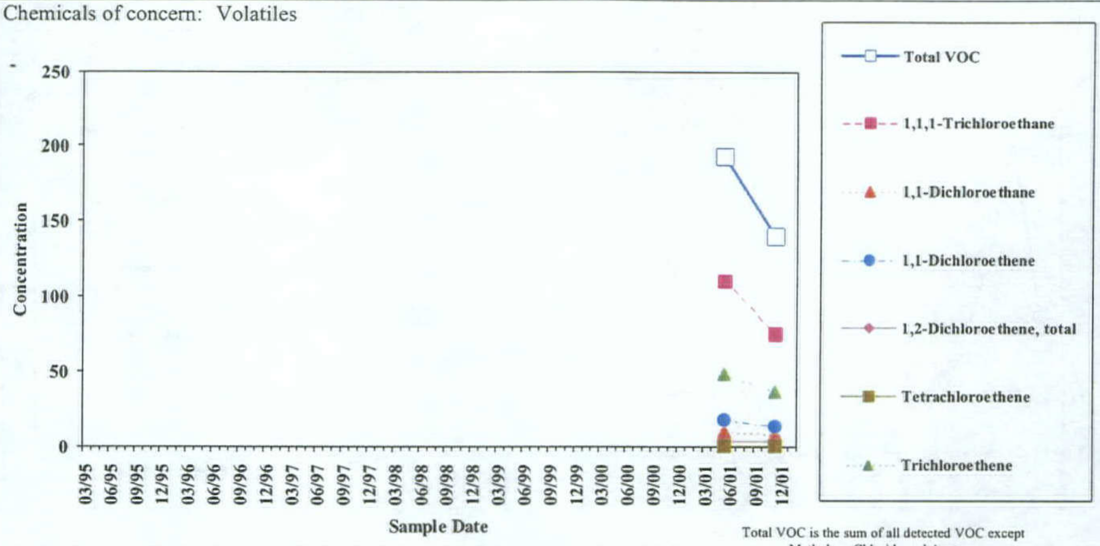
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

EW-05A

Eastern Plume
Ground water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

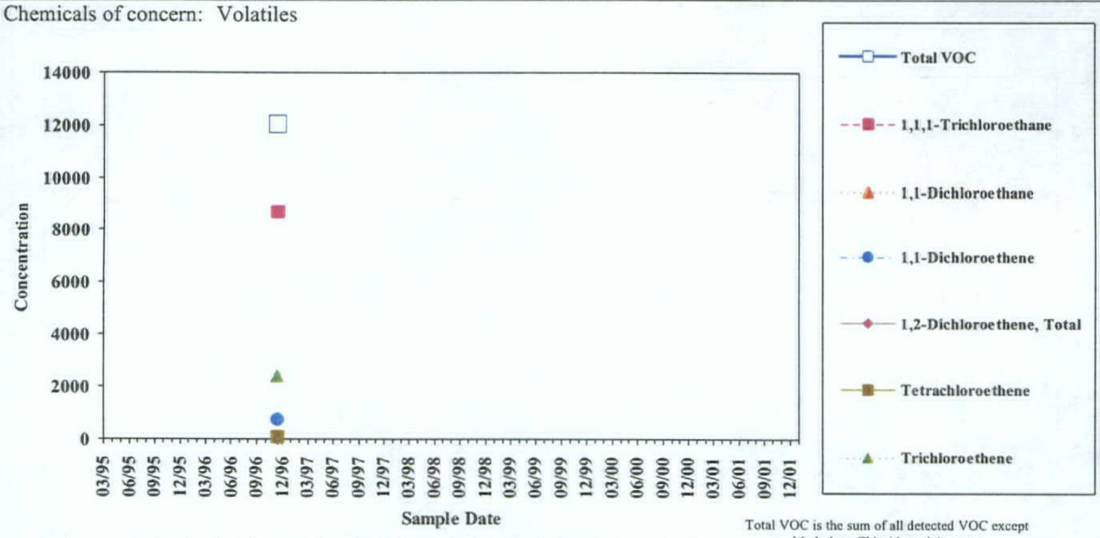
Figure 25 of 86

Sample Location:

MW-101

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

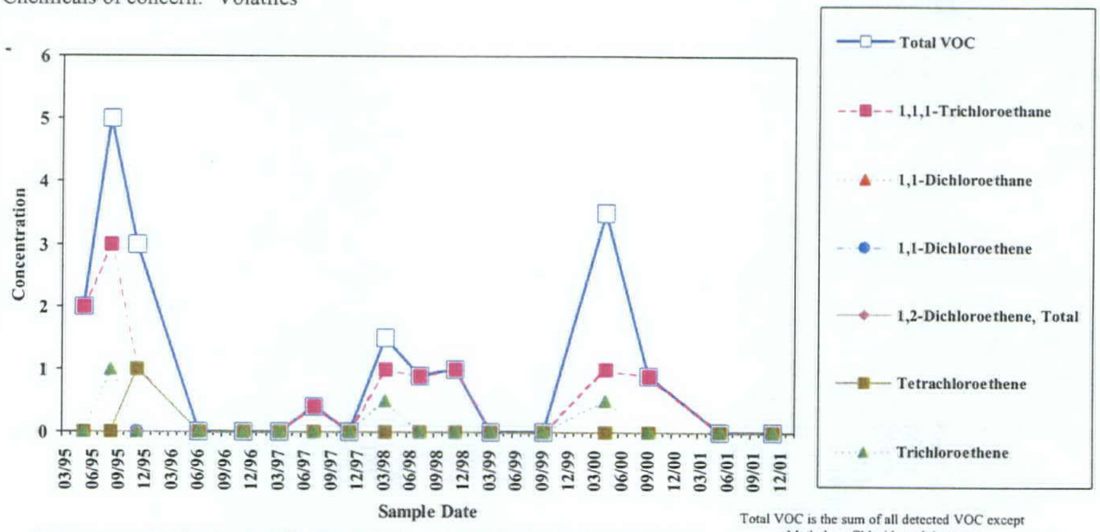
Figure 26 of 86

Sample Location:

MW-105A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

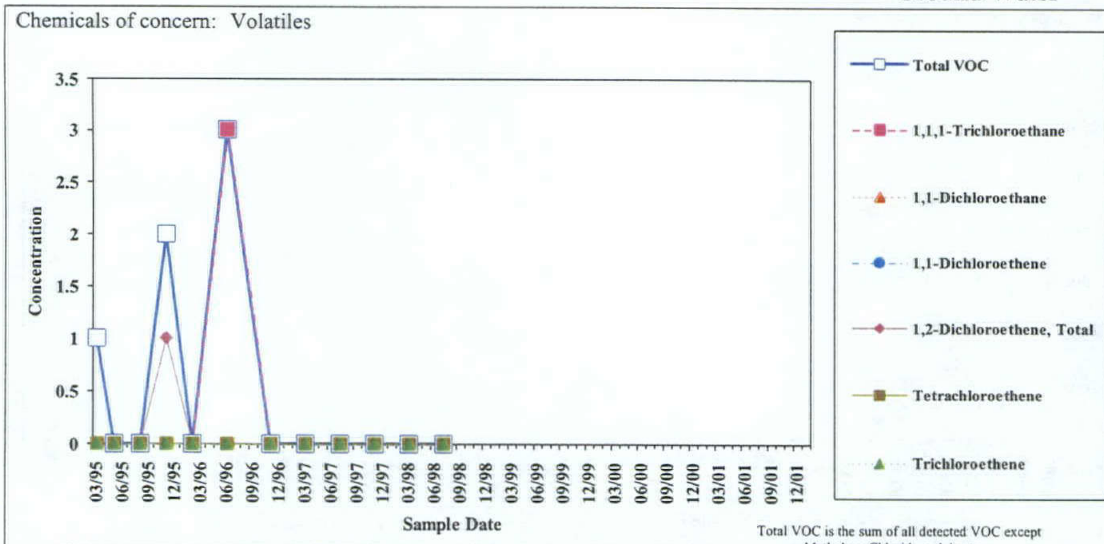
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-105B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

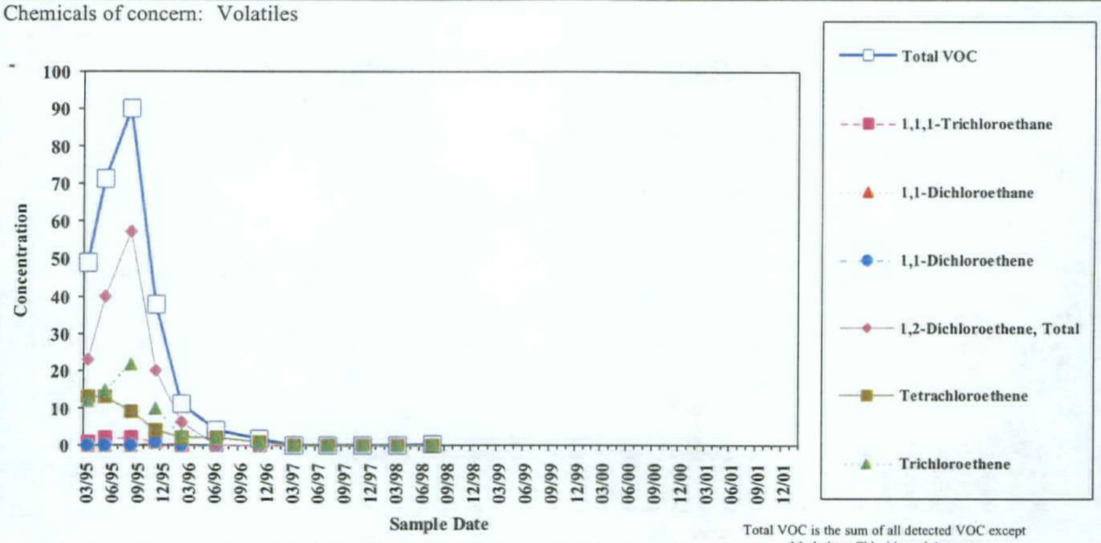
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-106

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

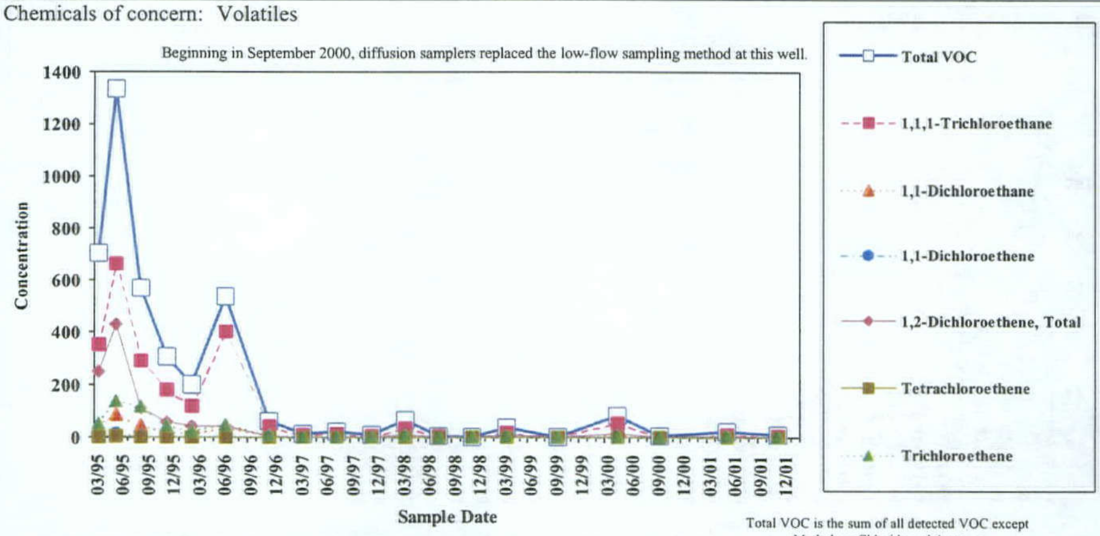
Sample Location:

MW-1104

Eastern Plume
Ground Water

Chemicals of concern: Volatiles

Beginning in September 2000, diffusion samplers replaced the low-flow sampling method at this well.



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

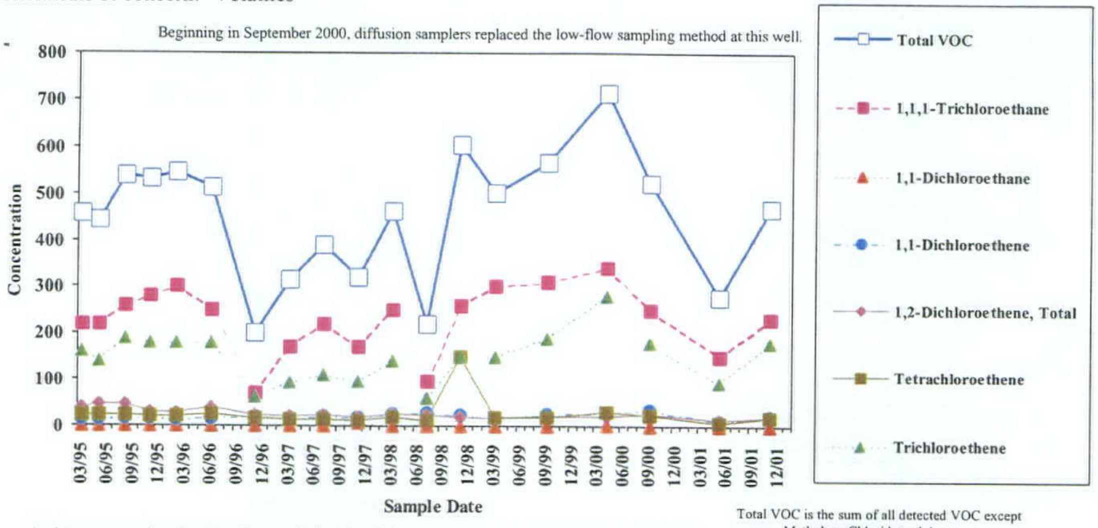
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-205

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: μg/L

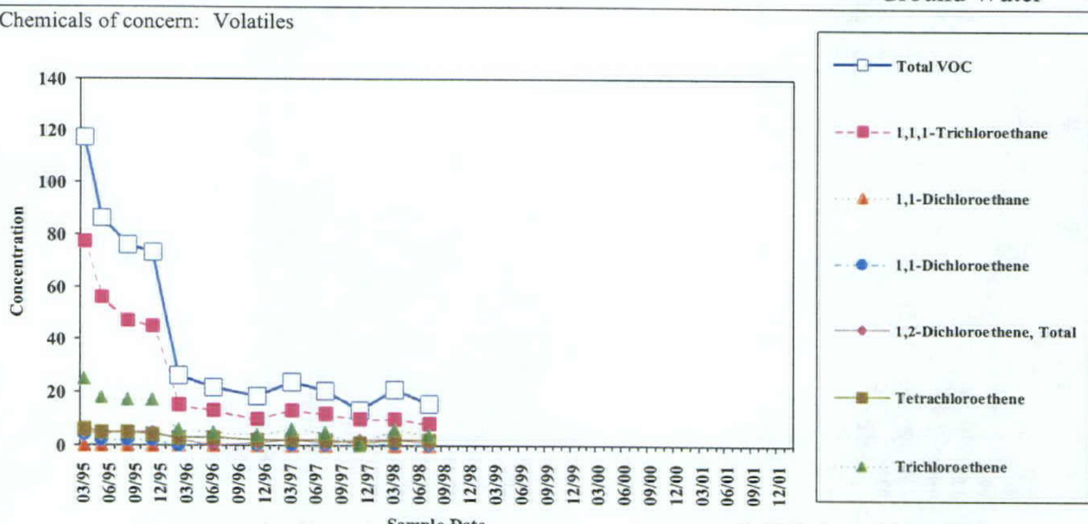
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-206A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: μg/L

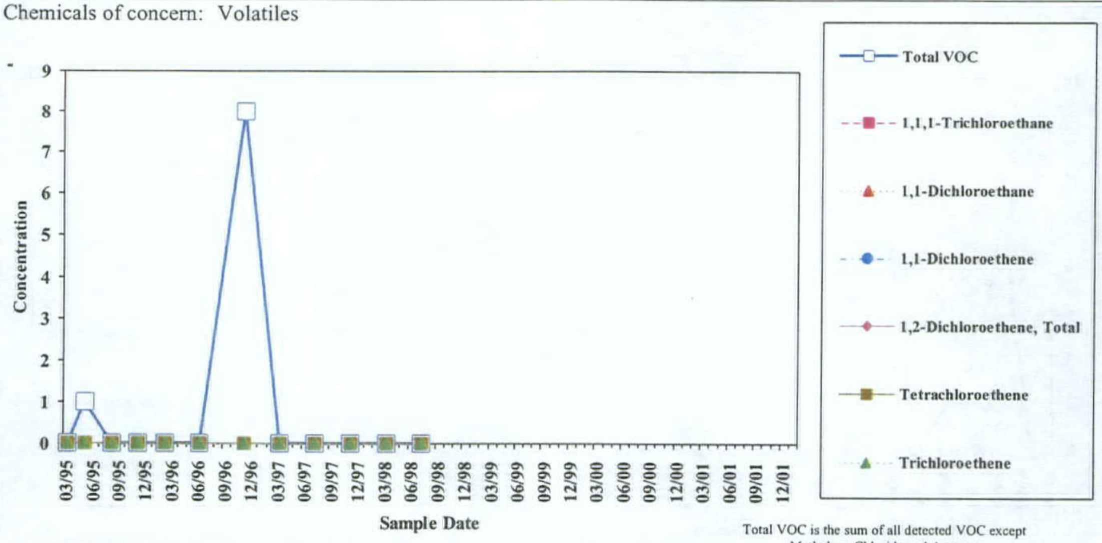
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-206B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

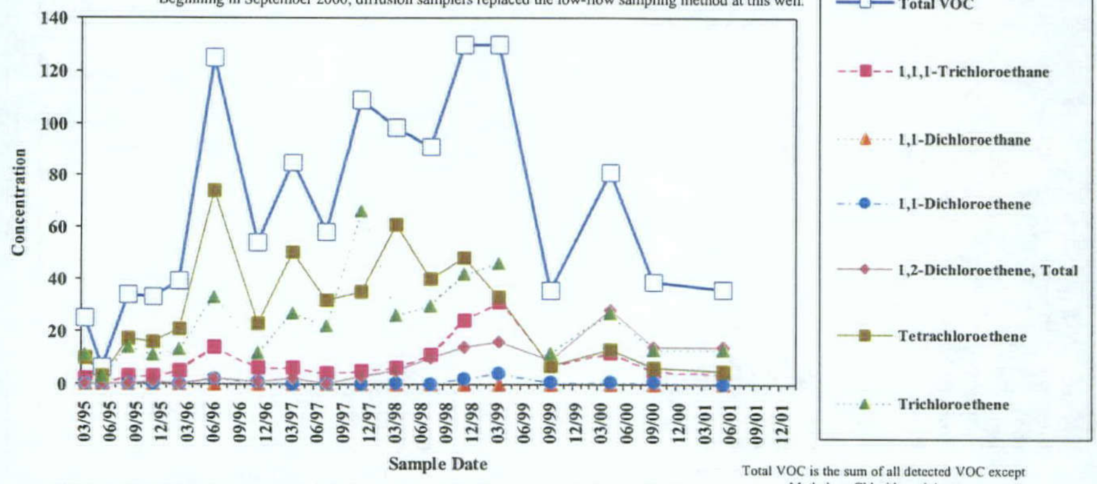
Sample Location:

MW-207A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles

Beginning in September 2000, diffusion samplers replaced the low-flow sampling method at this well.



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

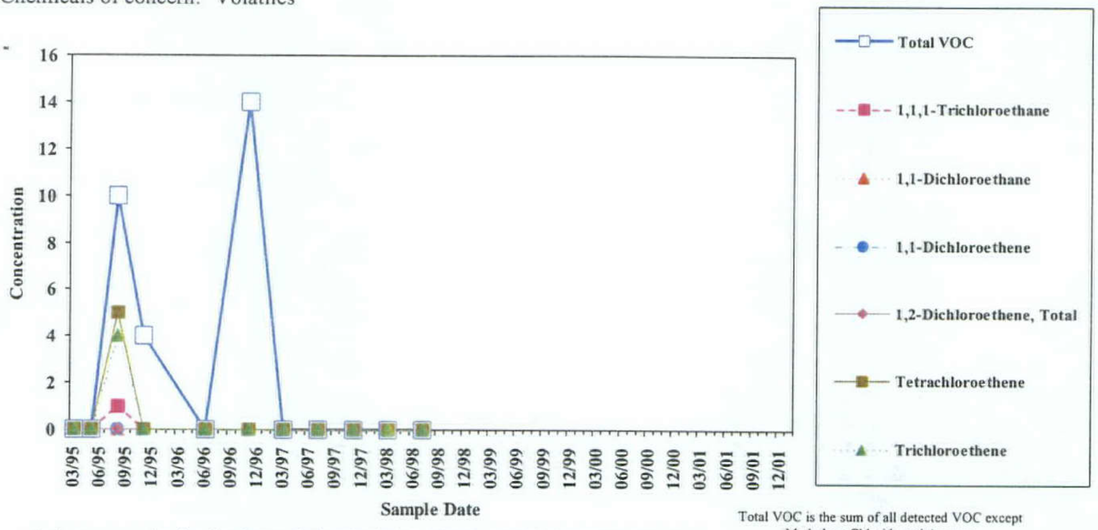
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-207B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

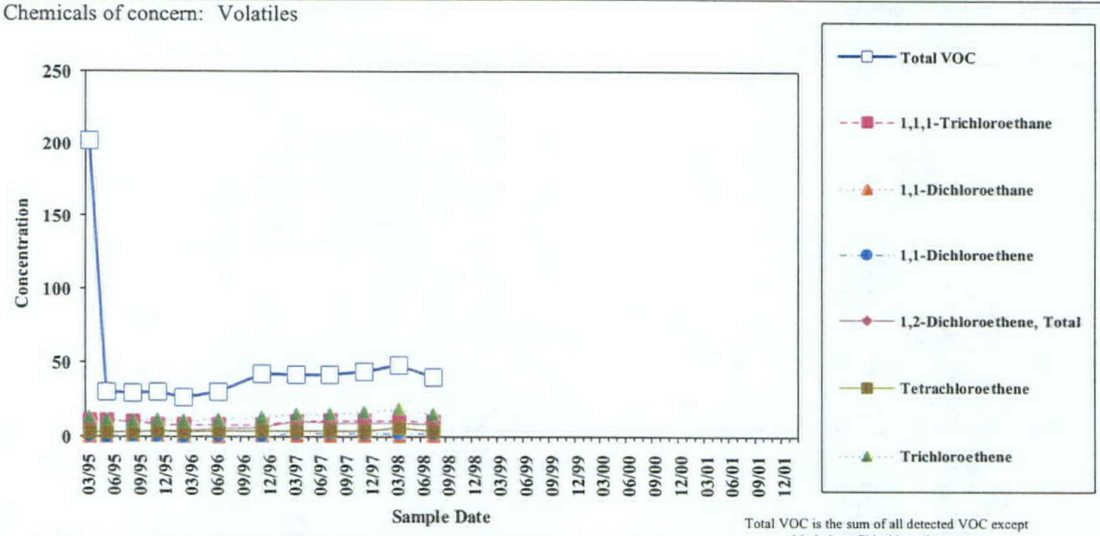
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-208

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

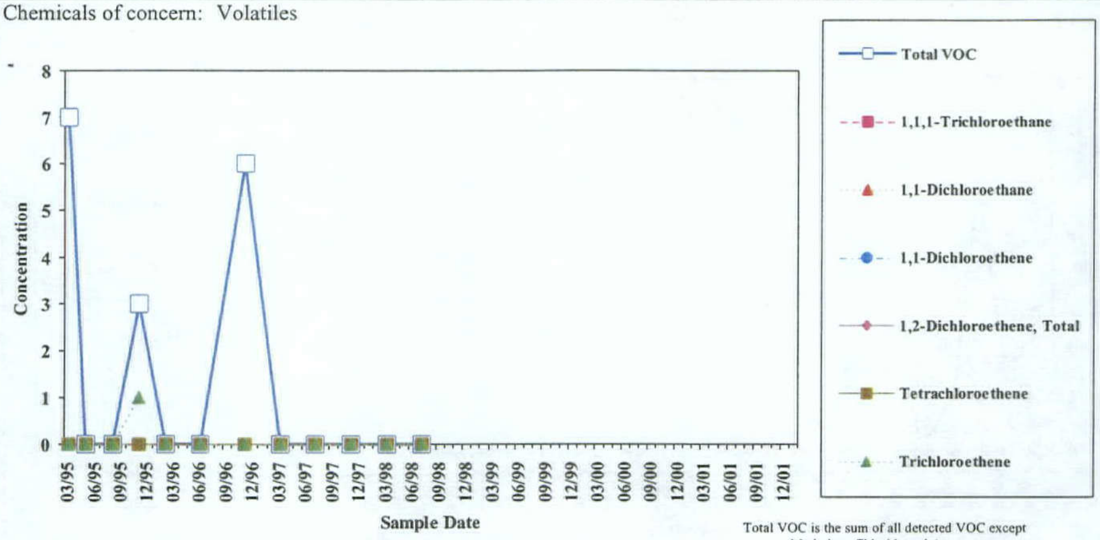
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-209

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

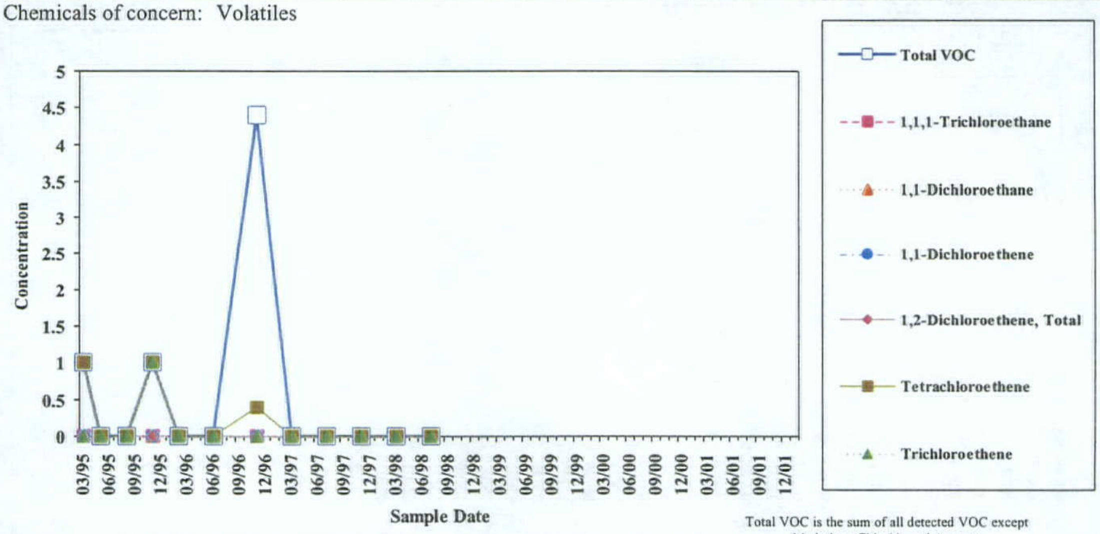
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-222

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

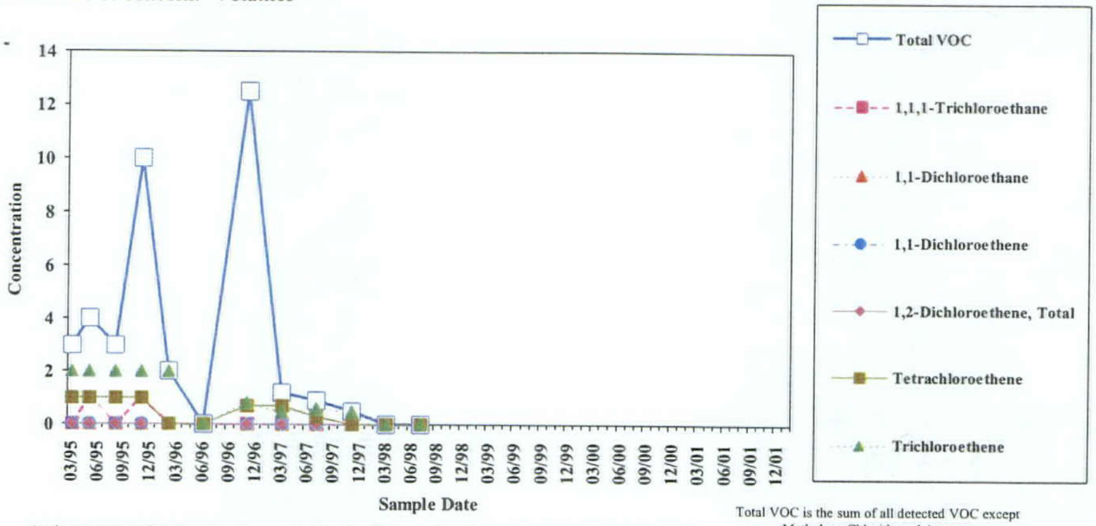
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-223

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

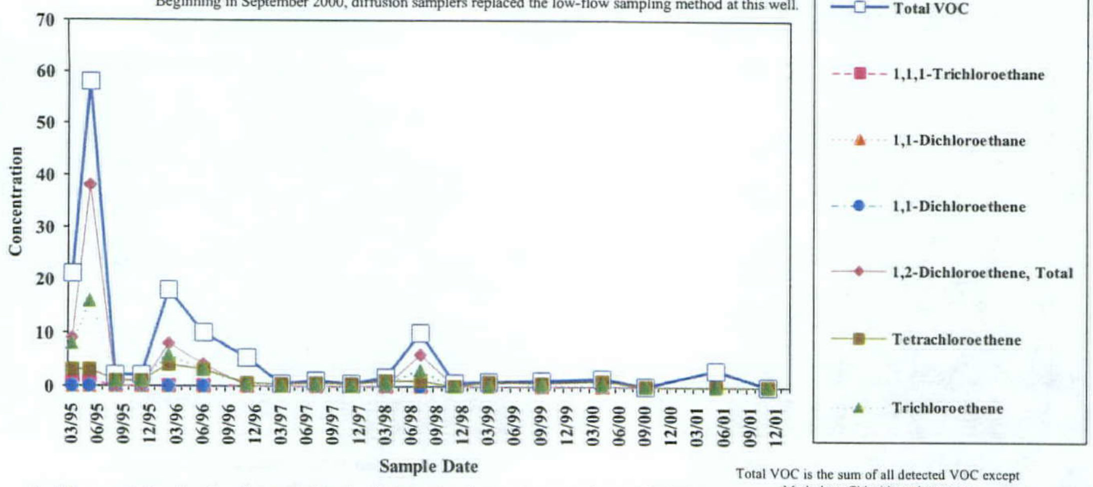
Sample Location:

MW-224

Eastern Plume
Ground Water

Chemicals of concern: Volatiles

Beginning in September 2000, diffusion samplers replaced the low-flow sampling method at this well.



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

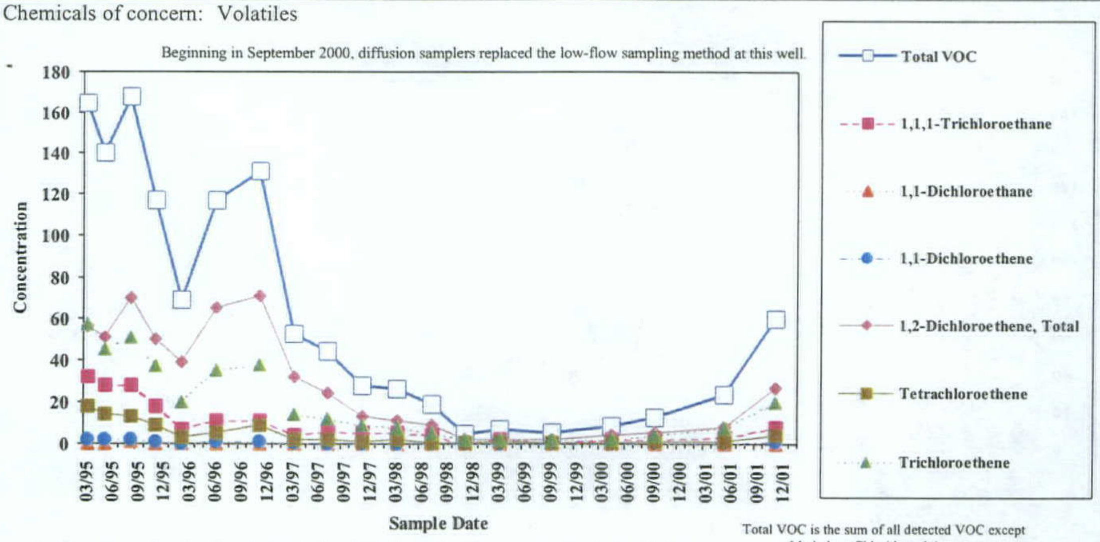
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-225A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

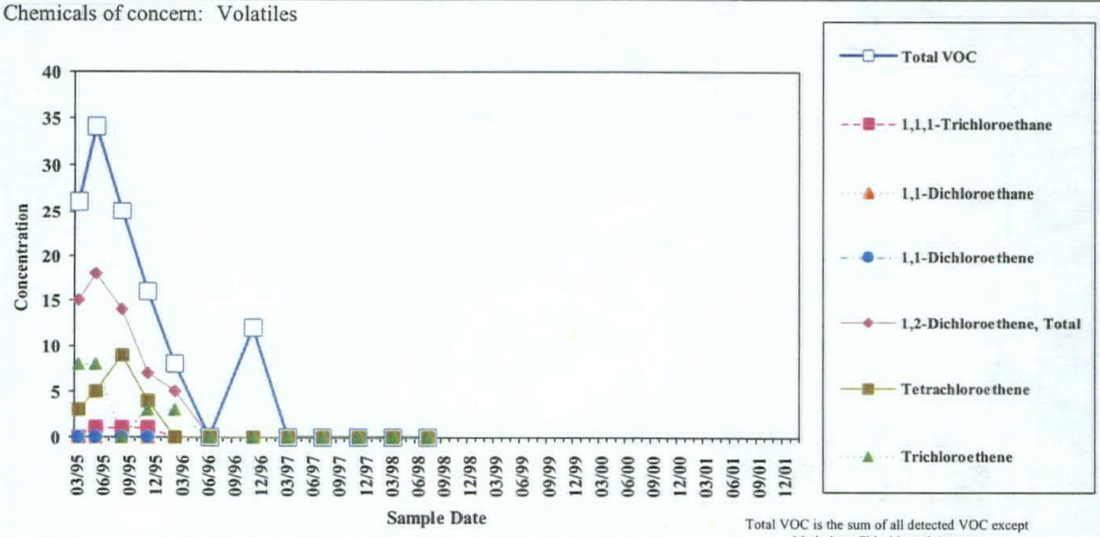
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-225B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

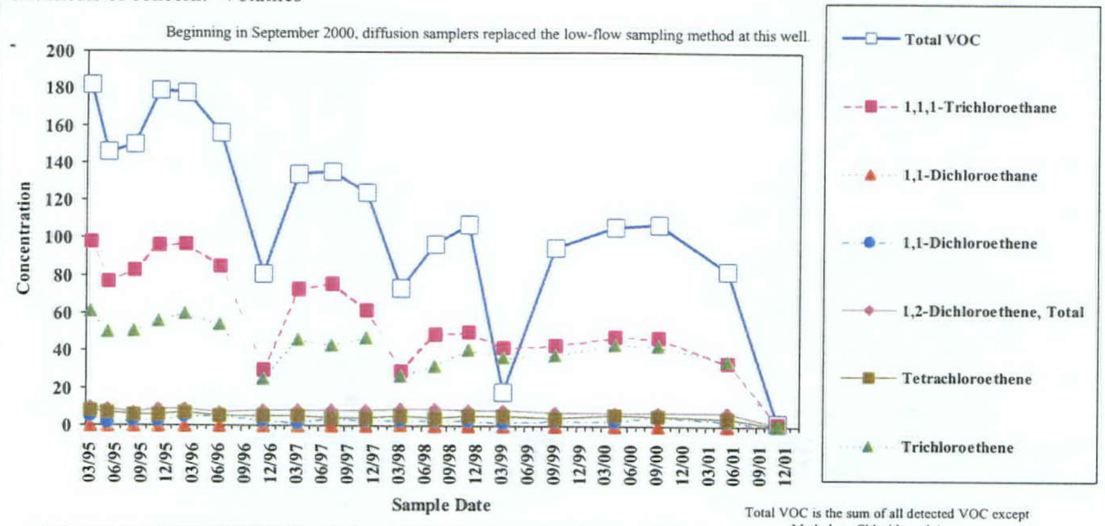
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-229A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

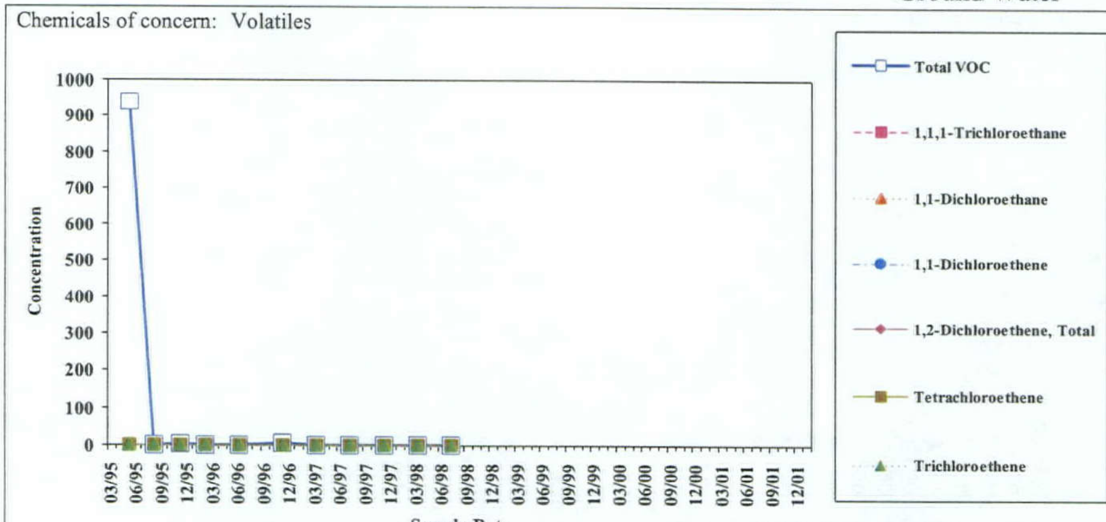
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-229B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

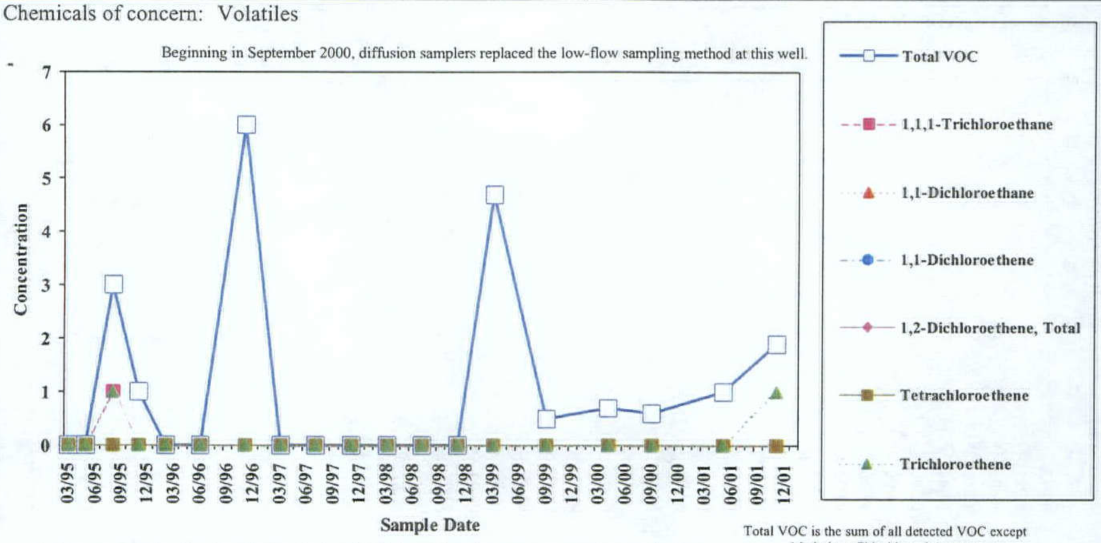
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-230A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

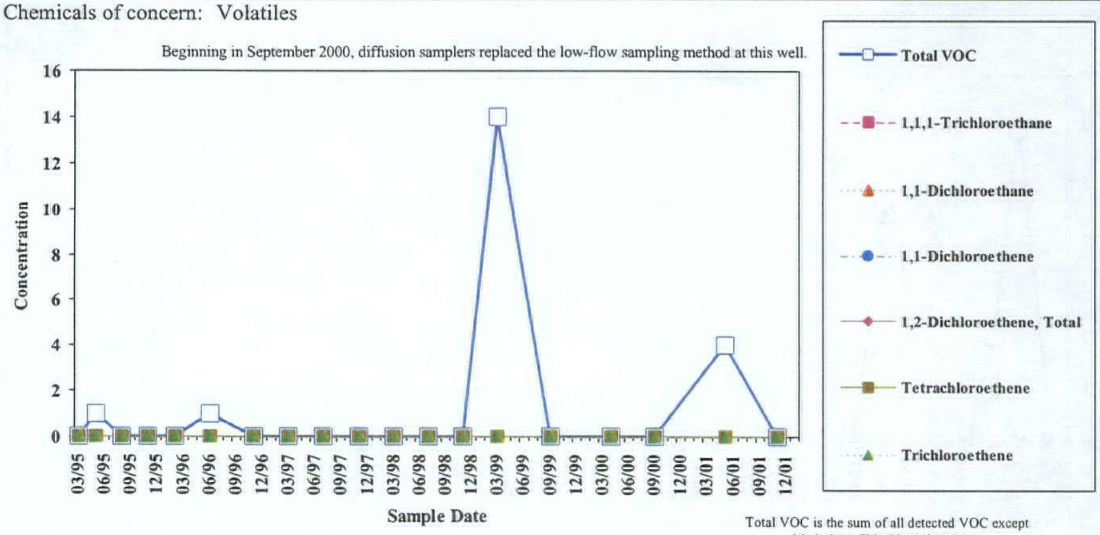
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-231A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

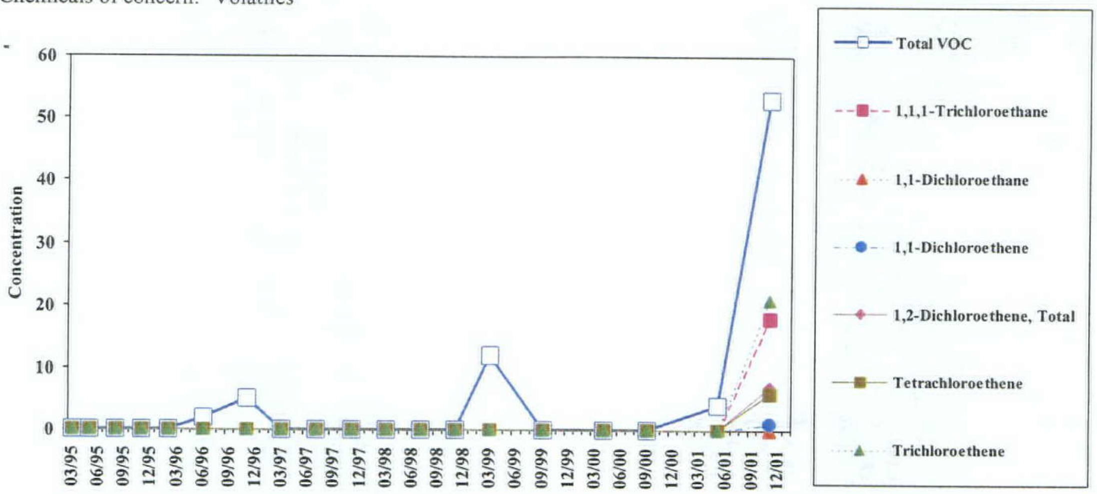
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-231B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Sample Date

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

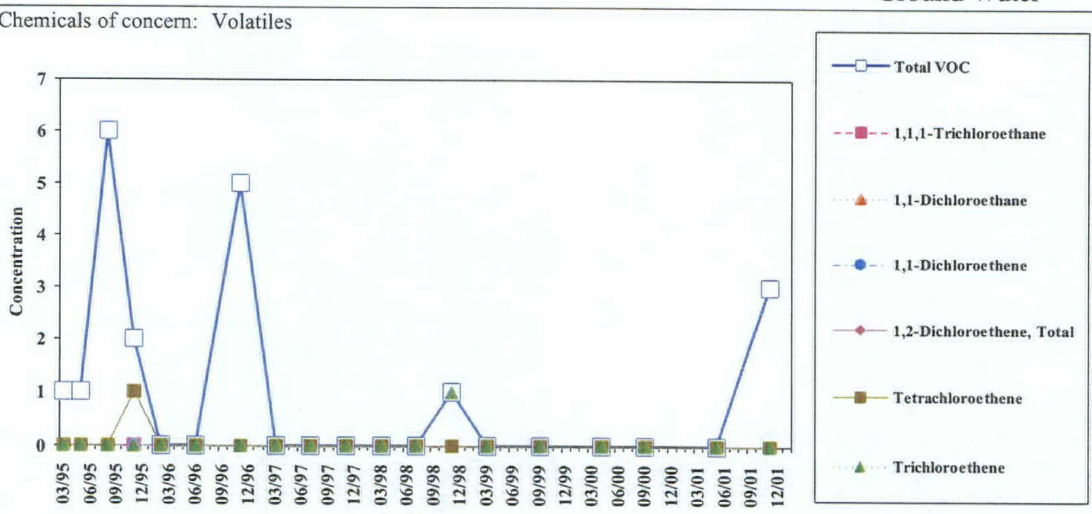
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-303

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Sample Date

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

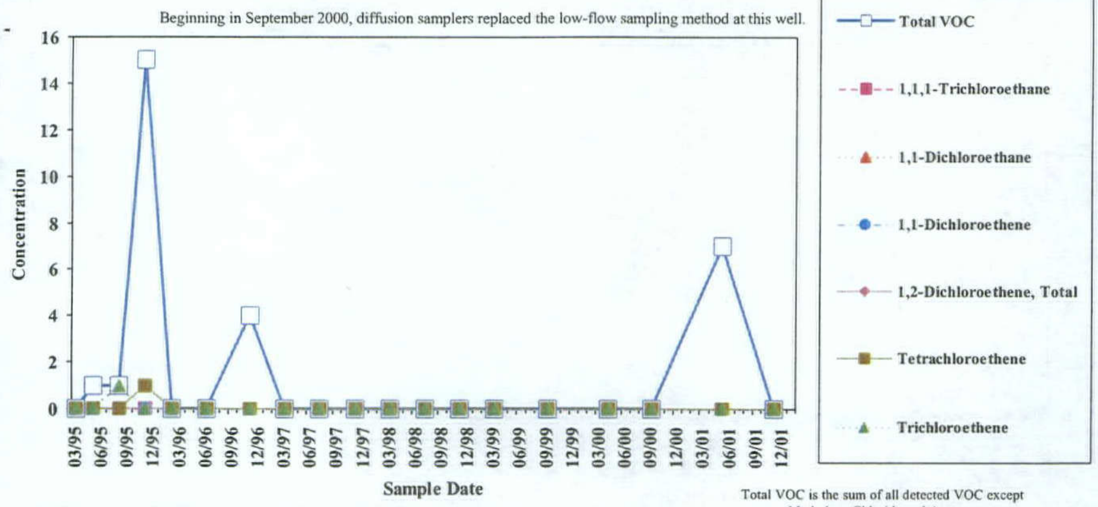
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-305

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

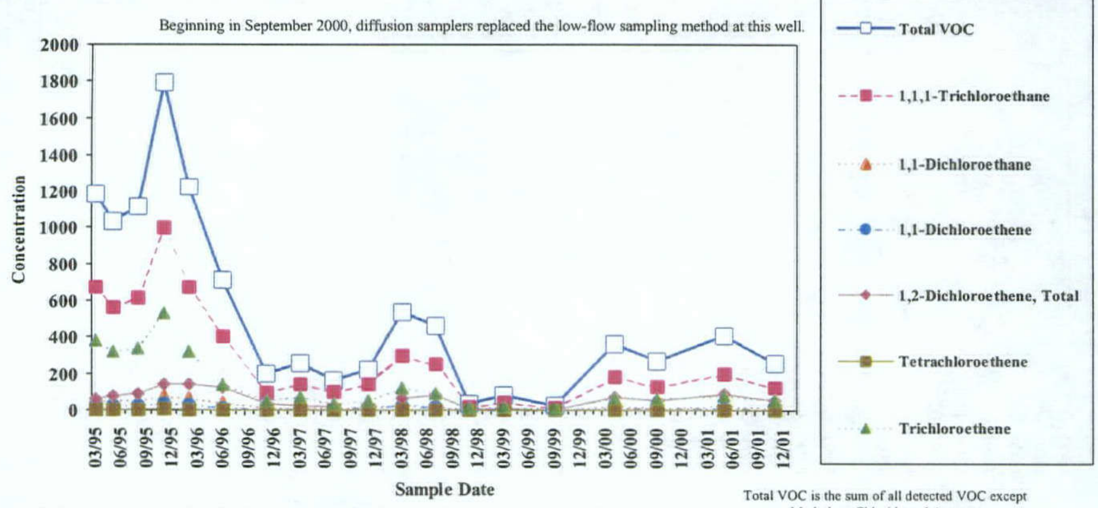
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-306

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

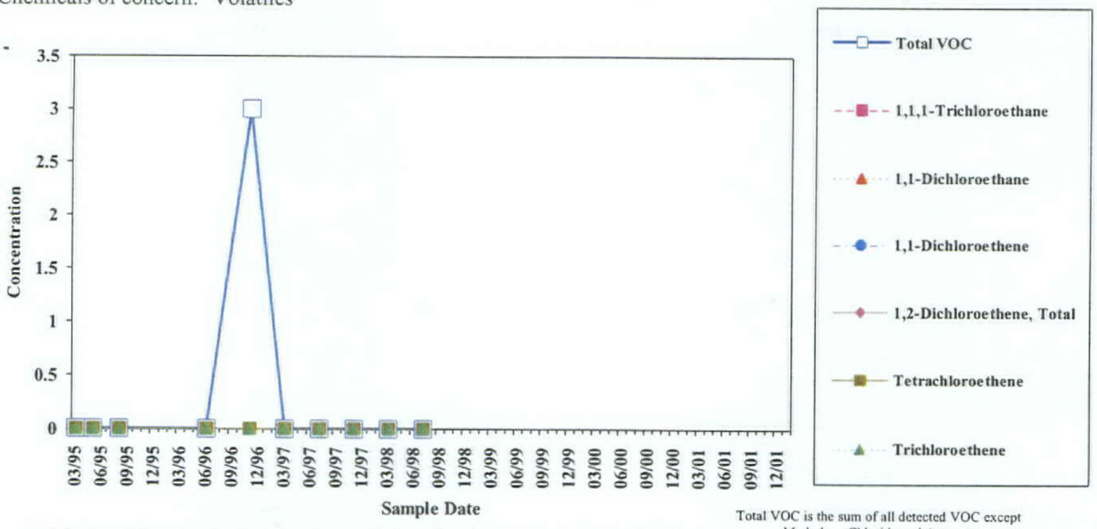
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-307

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

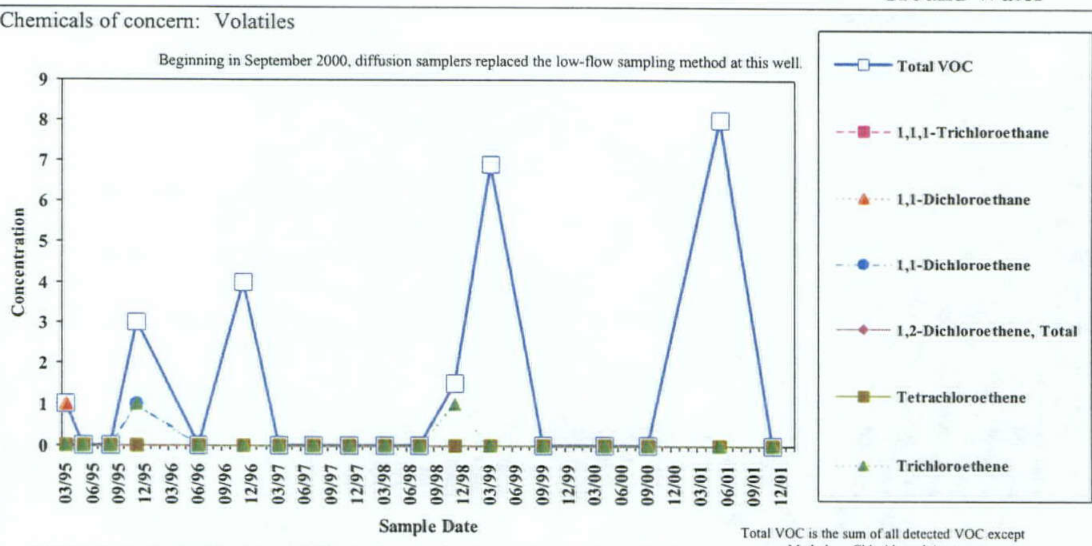
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-308

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

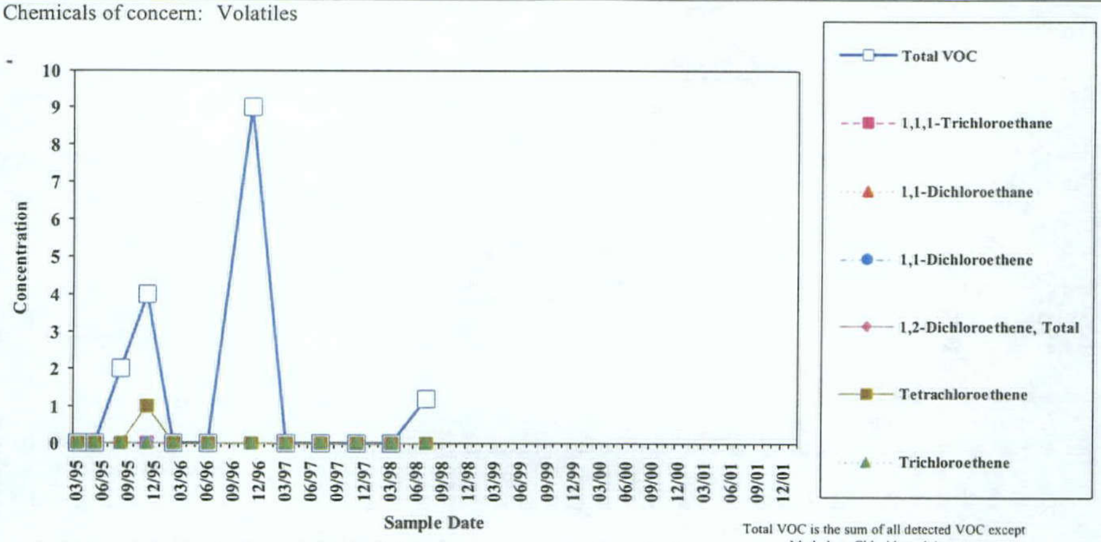
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-309A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

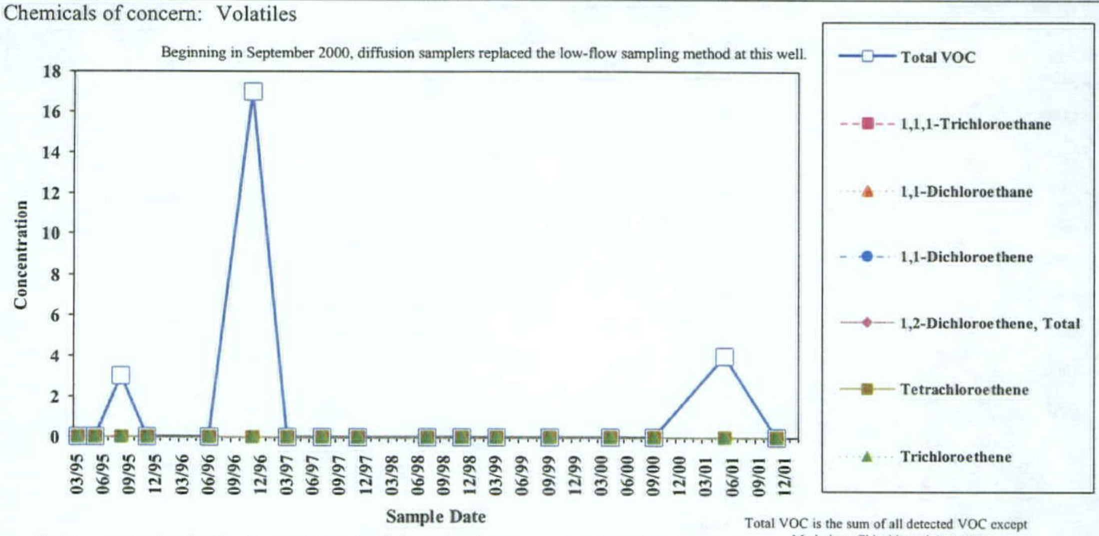
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-309B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

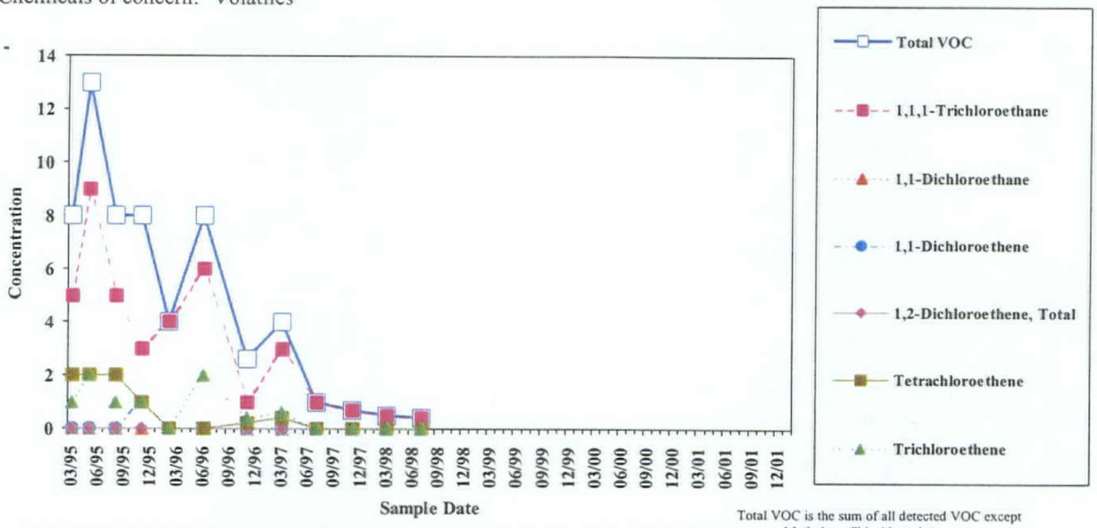
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-310

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

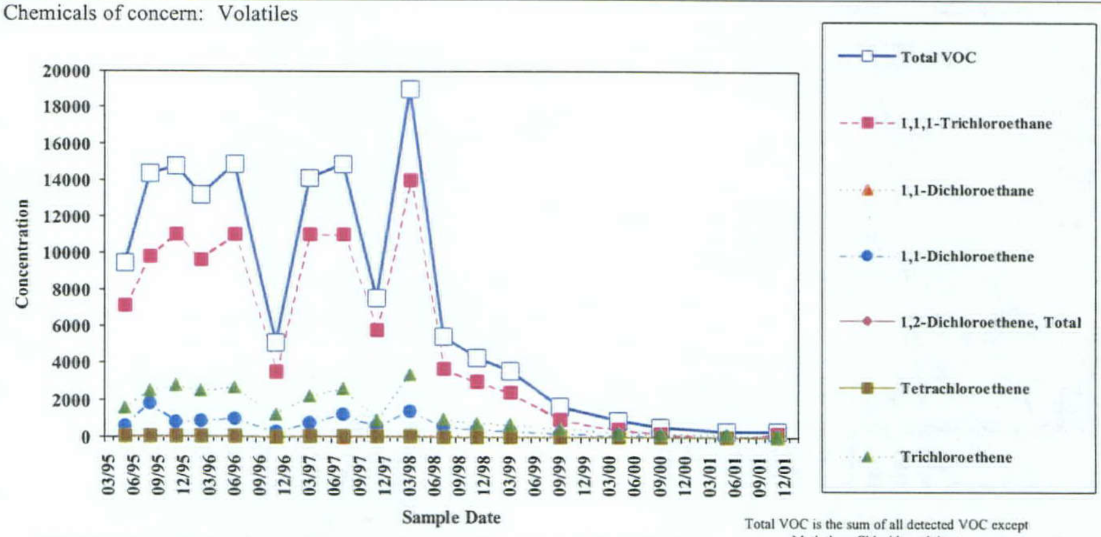
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-311

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

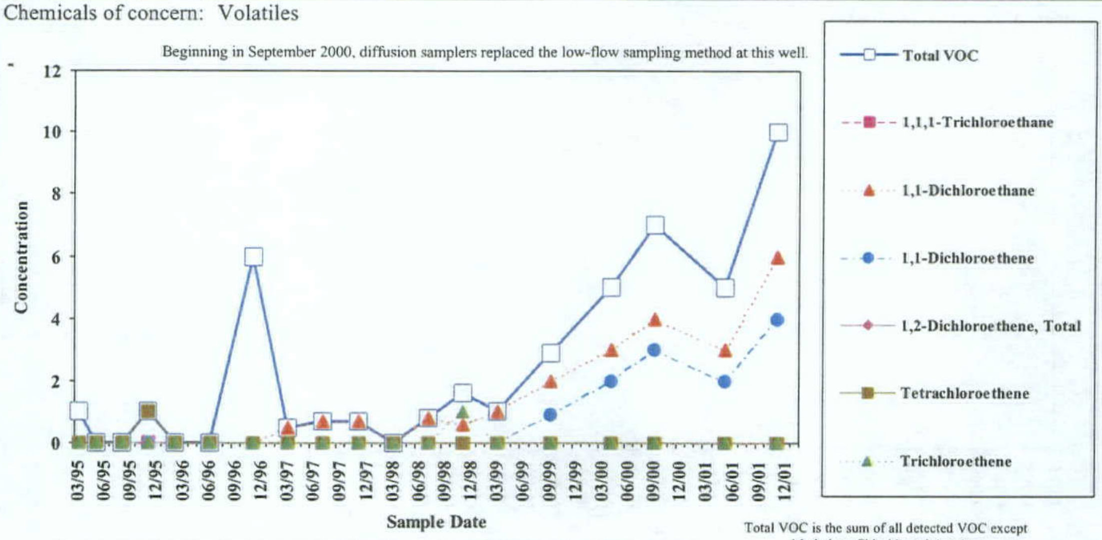
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-313

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

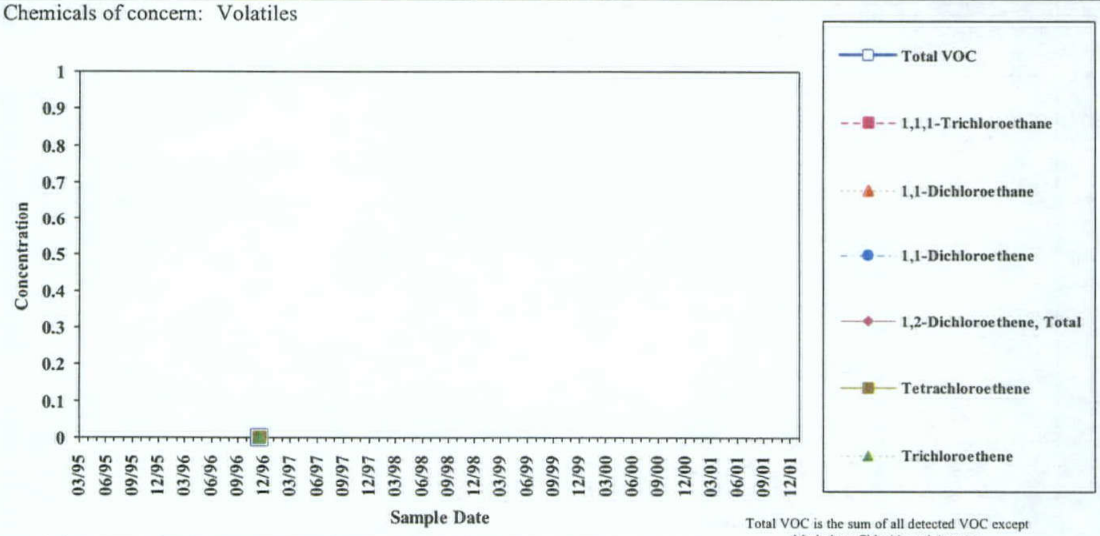
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-316A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

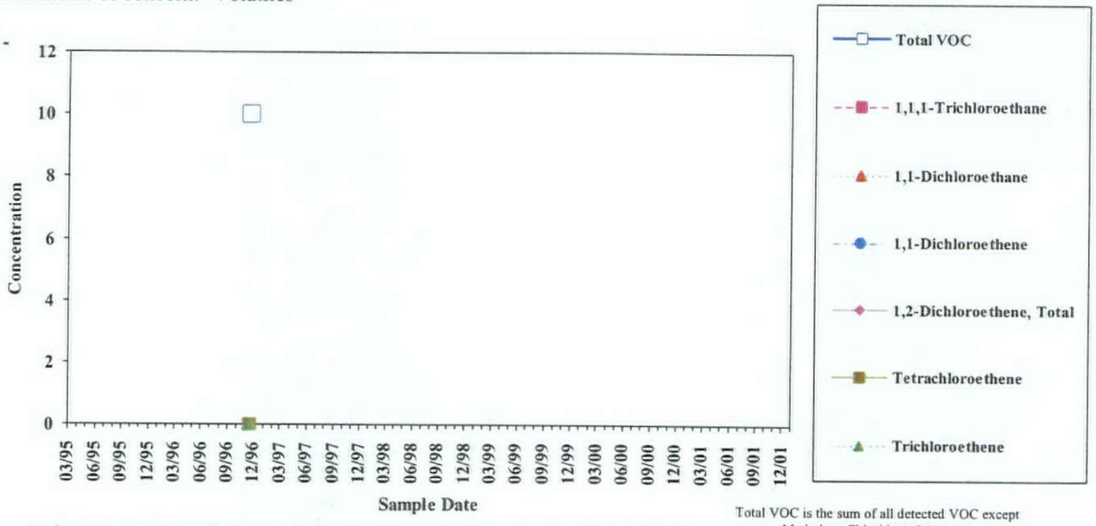
Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:
MW-316B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

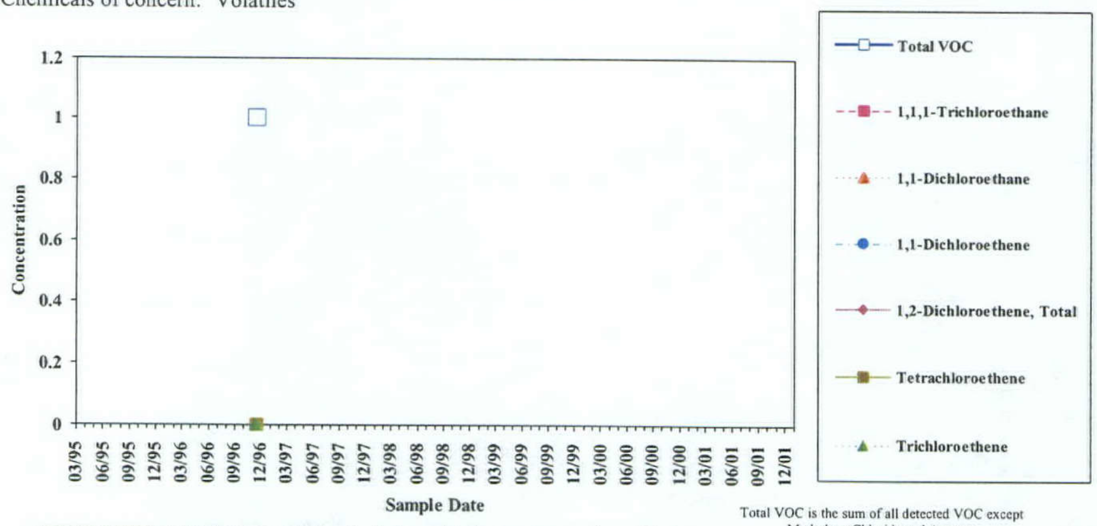
Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:
MW-317A

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

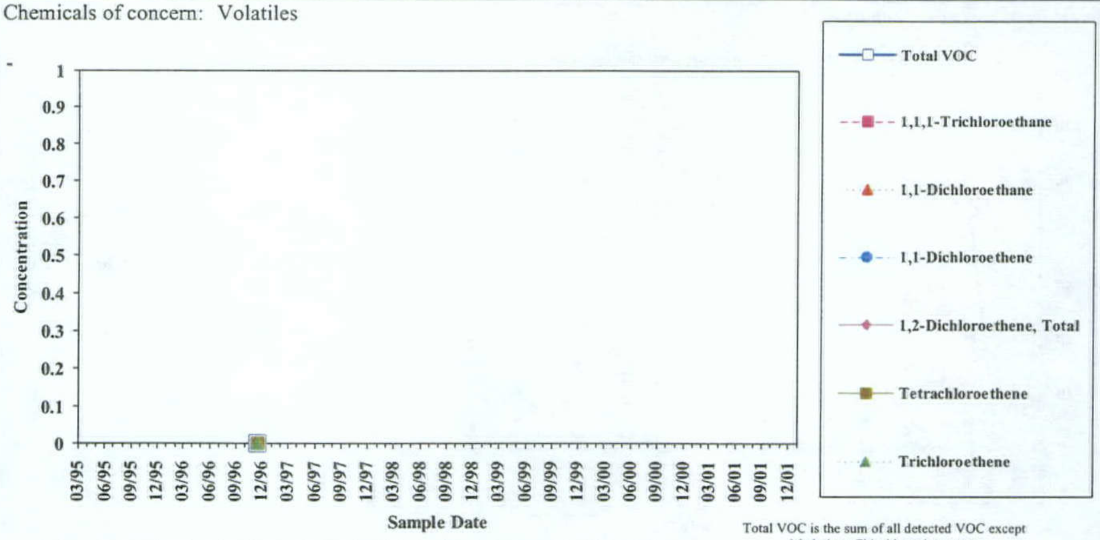
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-317B

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

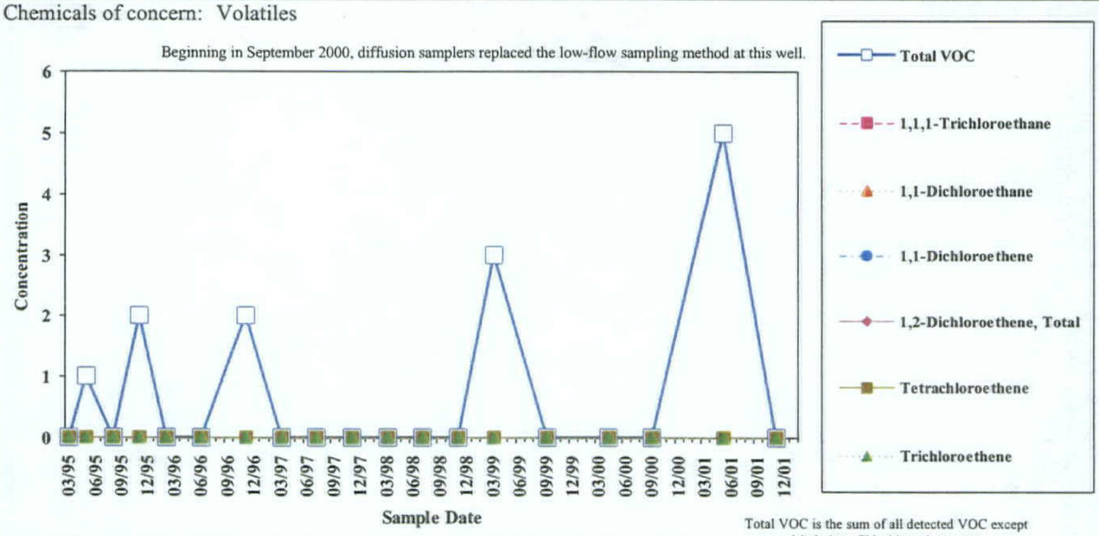
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-318

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

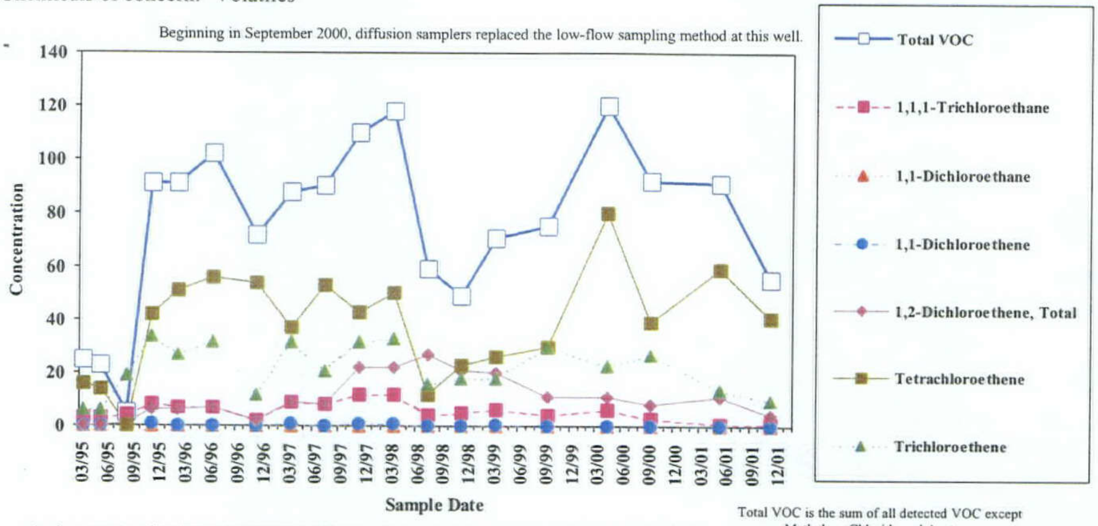
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-319

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

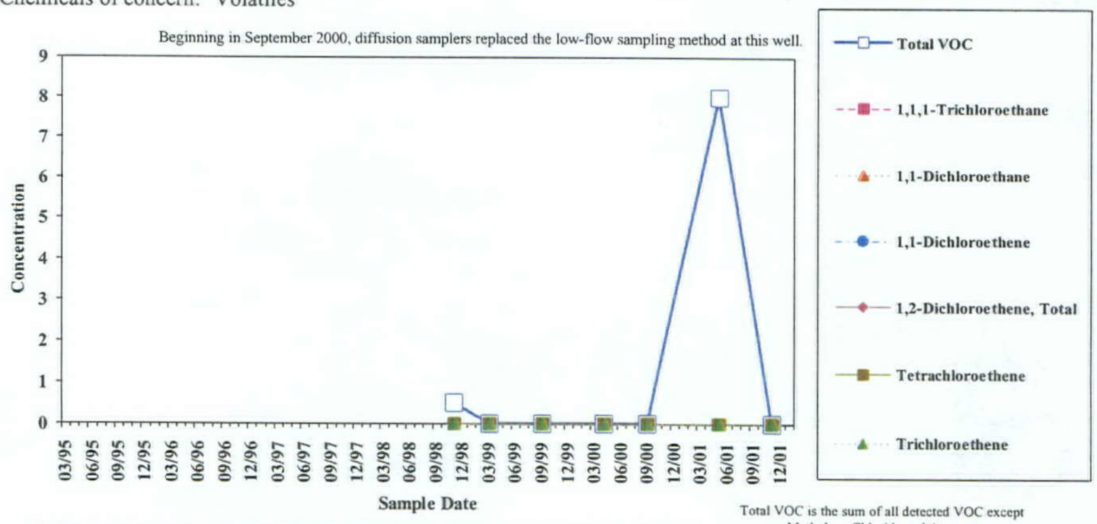
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-330

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

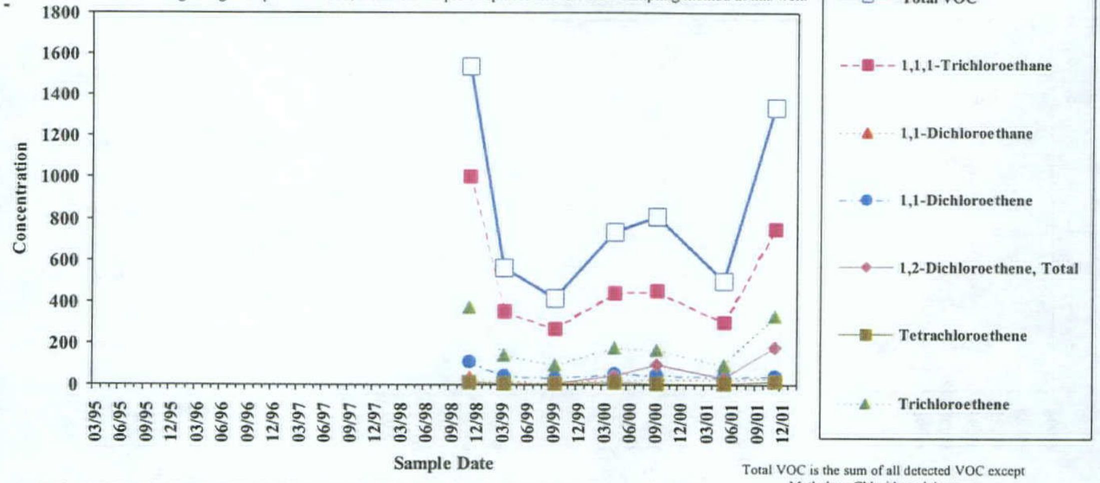
Sample Location:

MW-331

Eastern Plume
Ground Water

Chemicals of concern: Volatiles

Beginning in September 2000, diffusion samplers replaced the low-flow sampling method at this well.



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

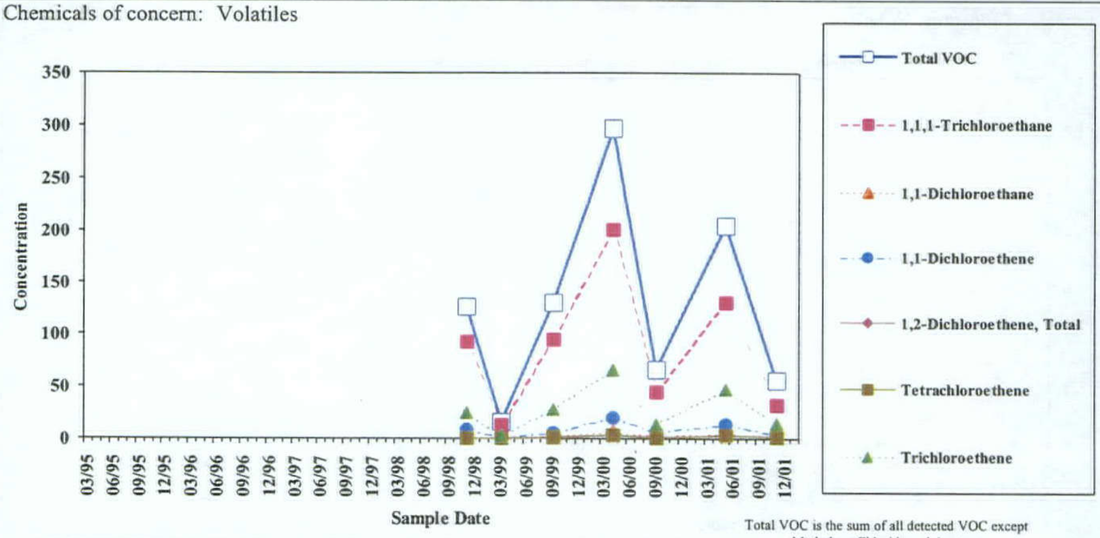
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-332

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

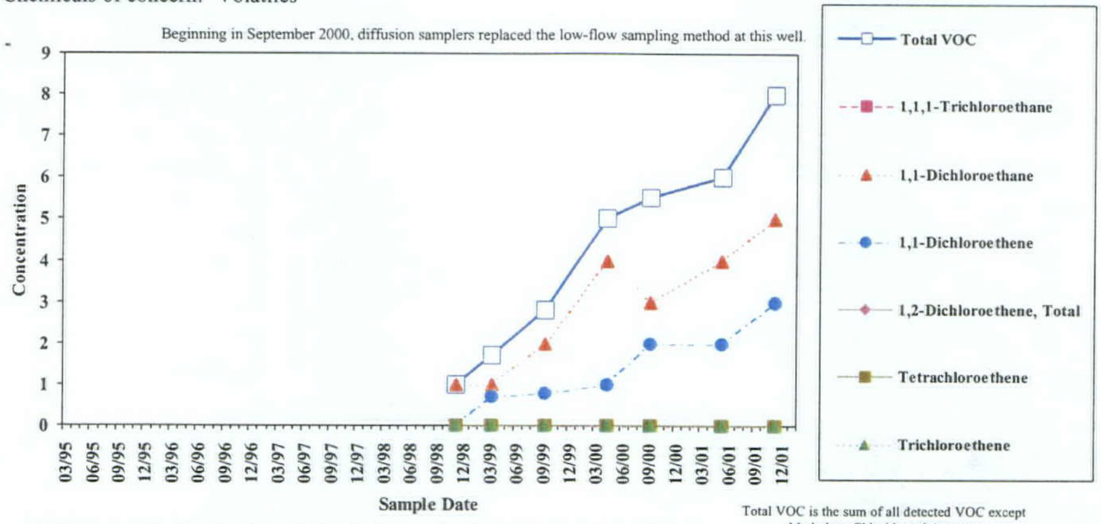
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-333

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

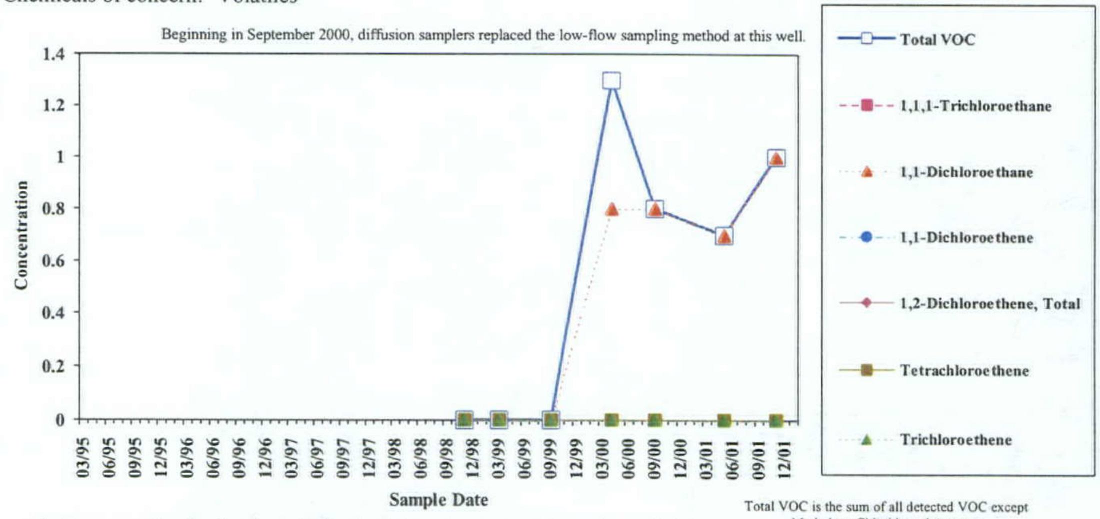
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-334

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

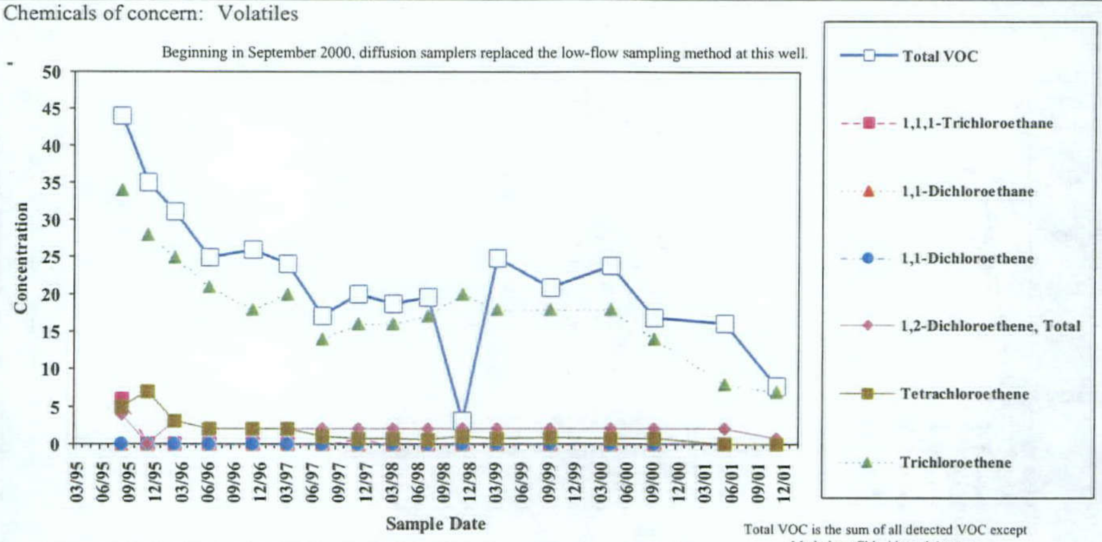
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

MW-NASB-212

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

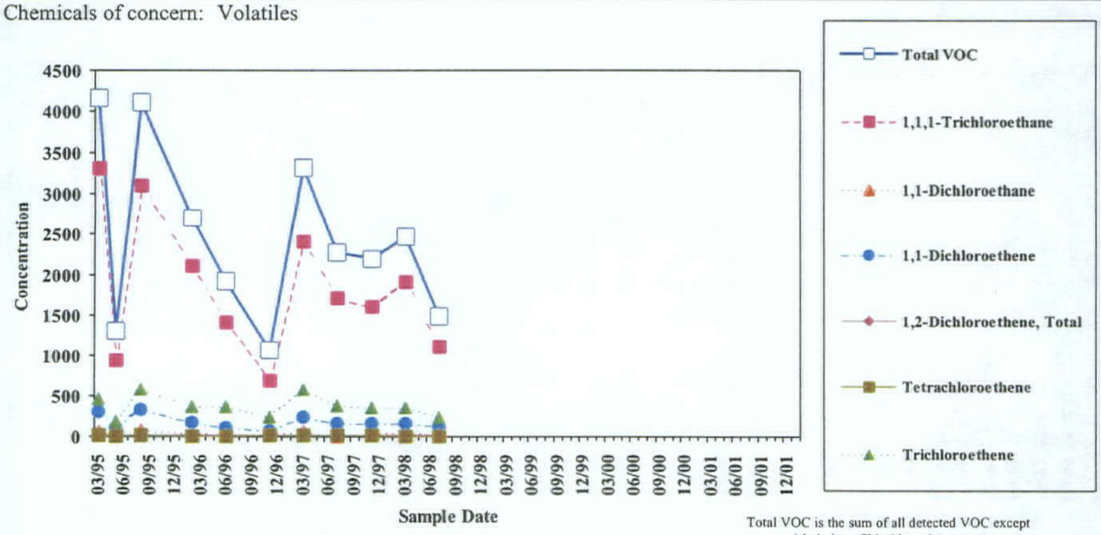
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

P-105

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

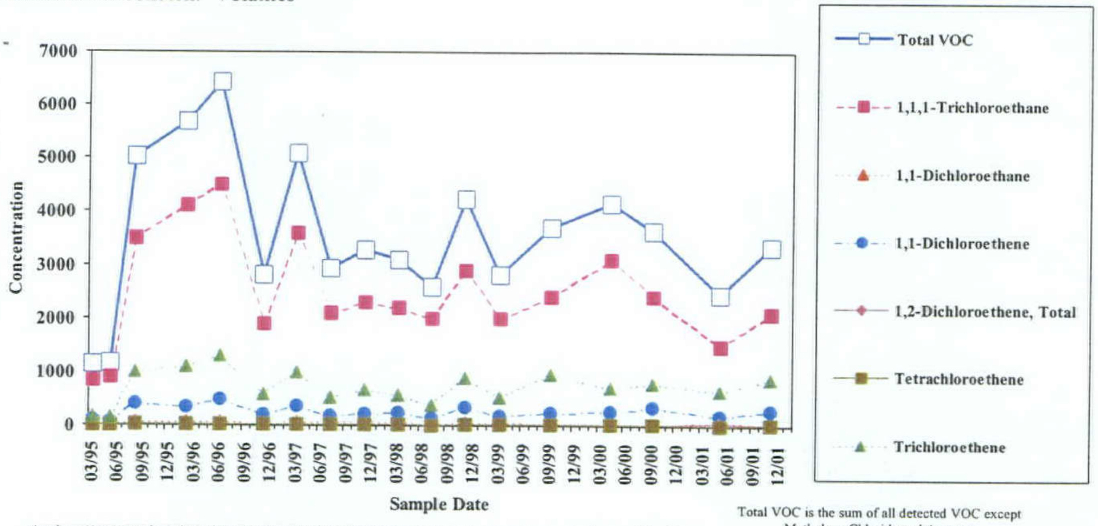
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

P-106

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

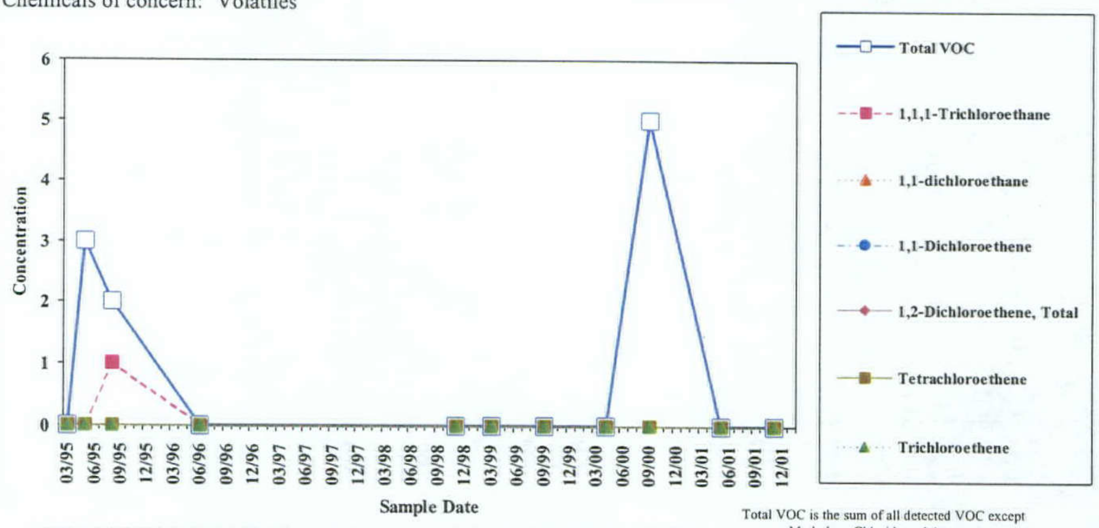
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

P-111

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Sample concentration units: µg/L

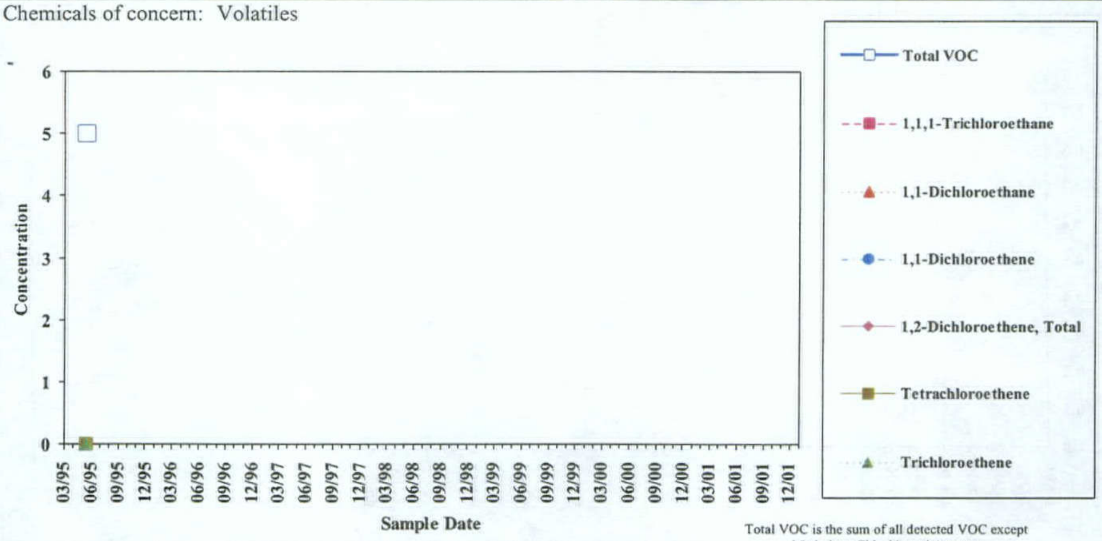
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

P-112

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

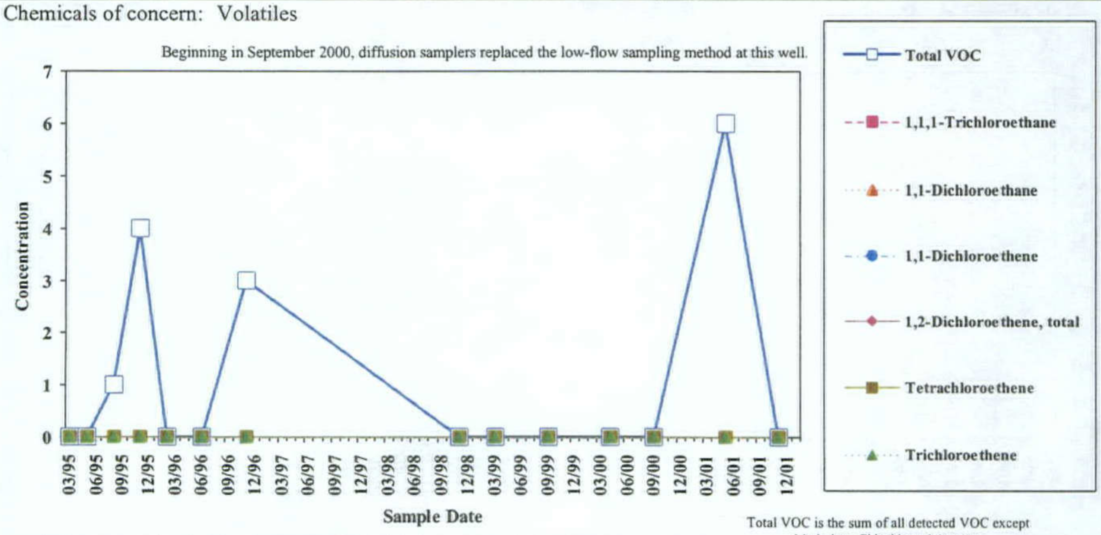
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

P-132

Eastern Plume
Ground Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

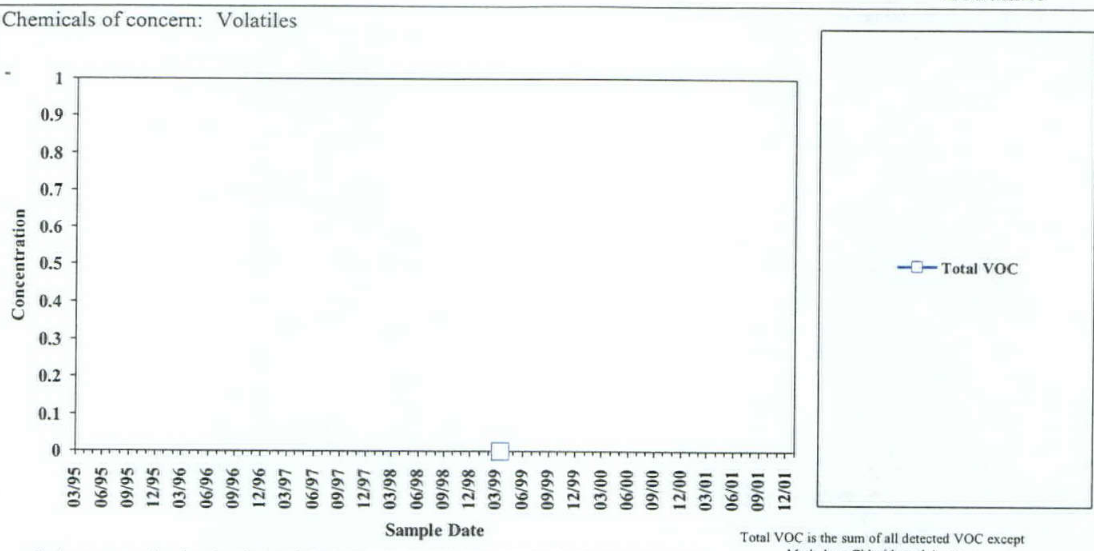
1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene, total		Tetrachloroethene		Trichloroethene	
MEG:	200	MEG:	70	MEG:	7	MEG:	70	MEG:	3	MEG:	5
MCL:	200	MCL:	-	MCL:	7	MCL:	70	MCL:	5	MCL:	5

Sample Location:

SEEP-06

Eastern Plume
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

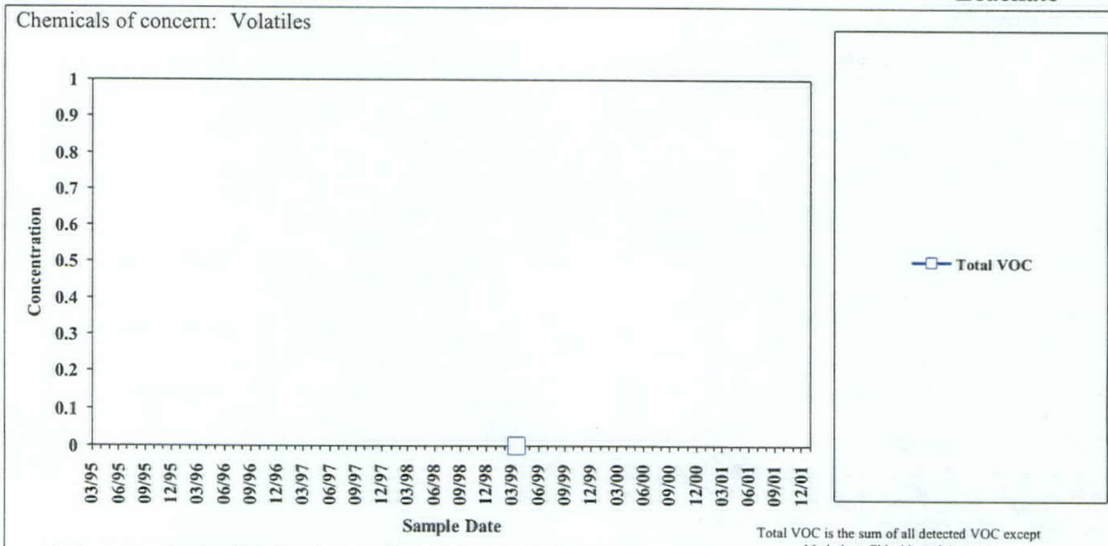
Sample concentration units: µg/L

Sample Location:

SEEP-07

Eastern Plume
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

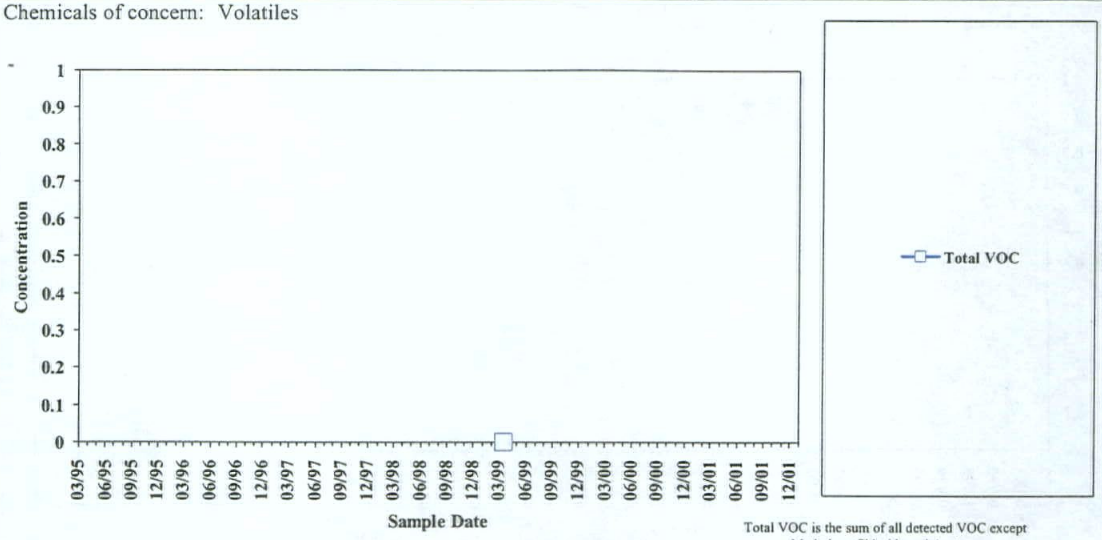
Sample Location:

SEEP-08

Eastern Plume

Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

Figure 77 of 86

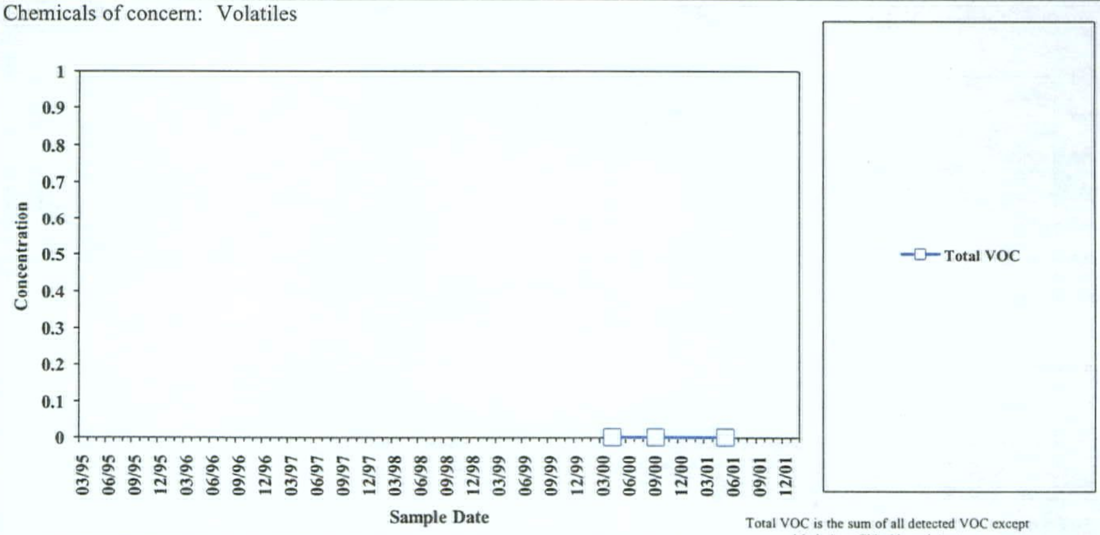
Sample Location:

SEEP-10

Eastern Plume

Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

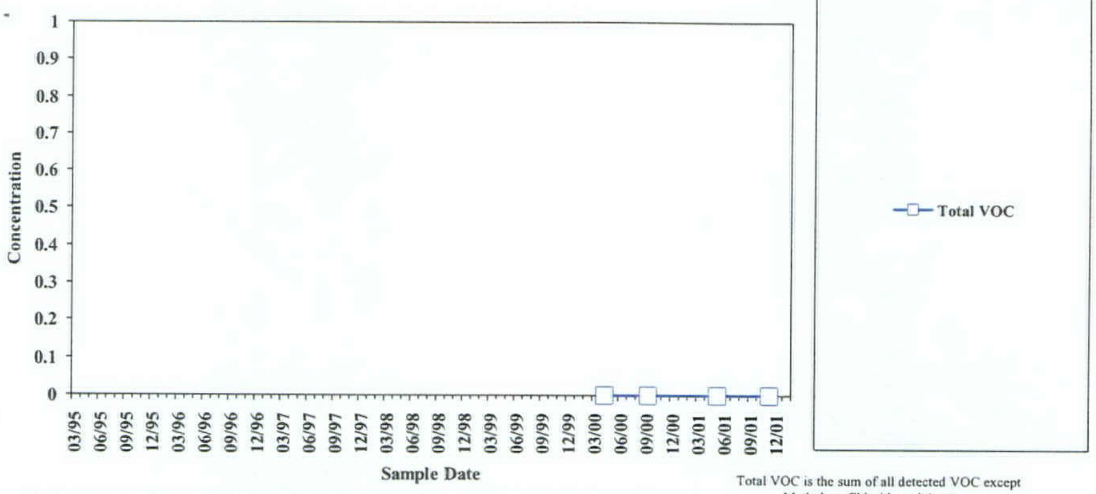
Figure 78 of 86

Sample Location:

SEEP-11

Eastern Plume
Leachate

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

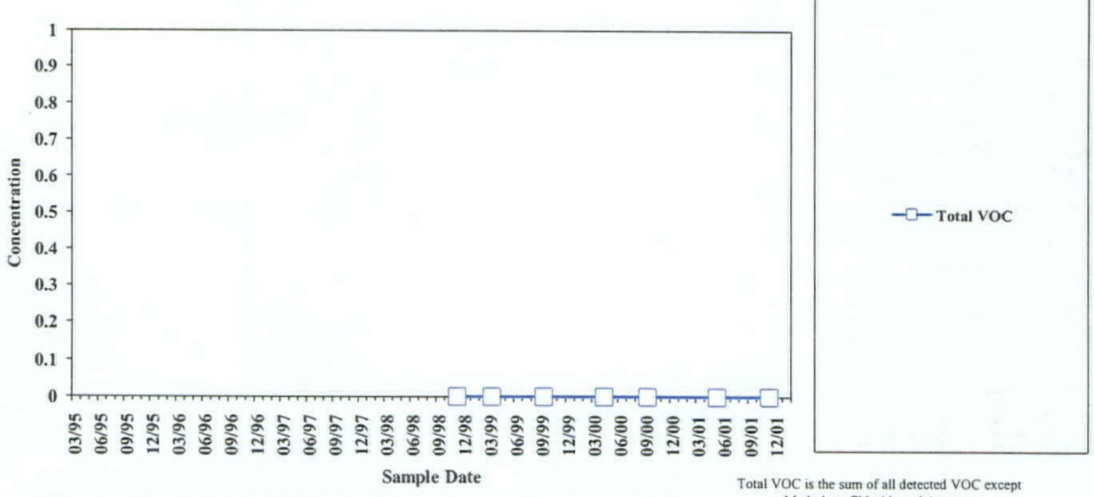
Figure 79 of 86

Sample Location:

SW-10

Eastern Plume
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

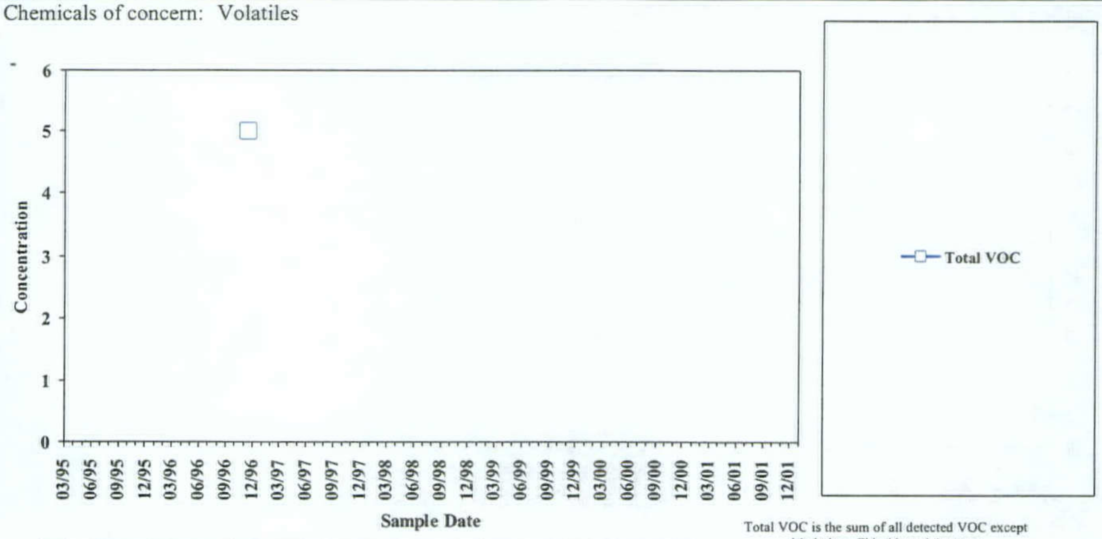
Figure 80 of 86

Sample Location:

SW-100

Eastern Plume
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

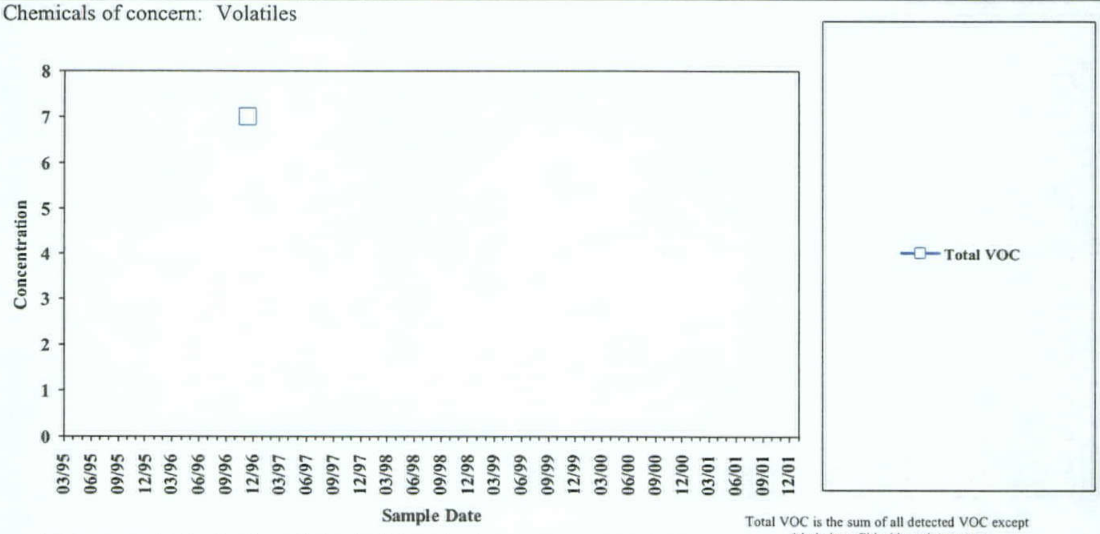
Figure 81 of 86

Sample Location:

SW-101

Eastern Plume
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

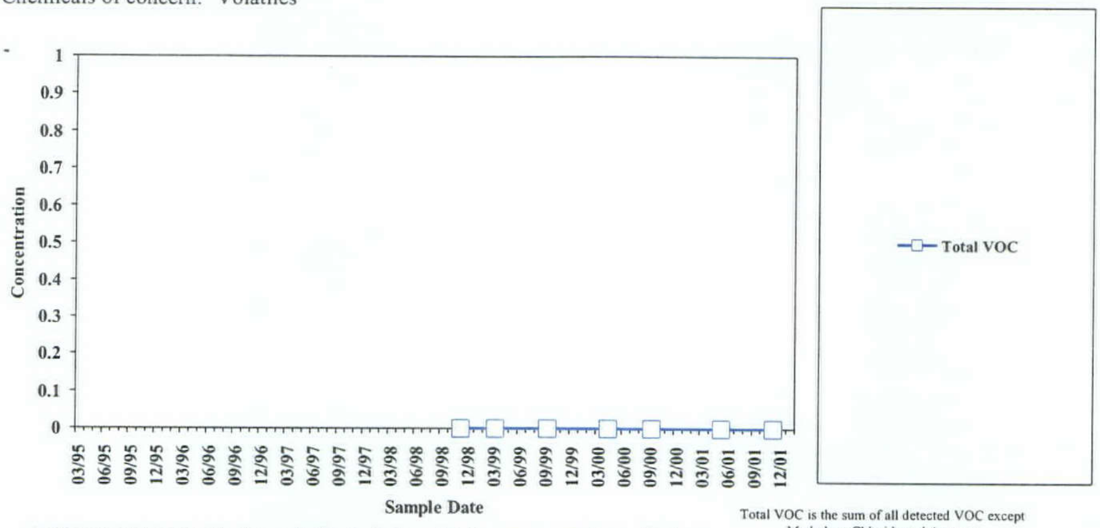
Figure 82 of 86

Sample Location:

SW-11

Eastern Plume
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

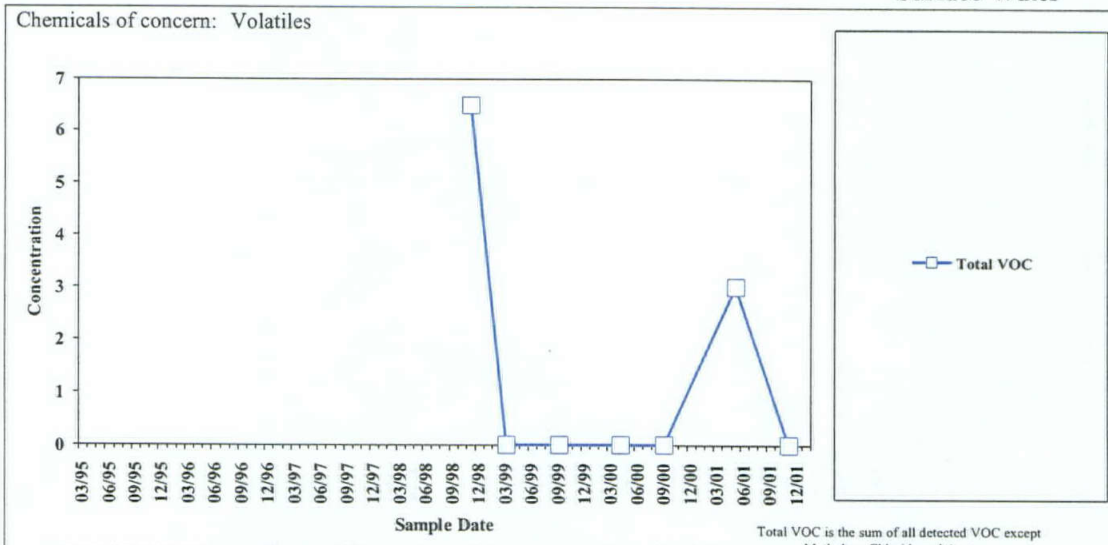
Sample concentration units: µg/L

Sample Location:

SW-12

Eastern Plume
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

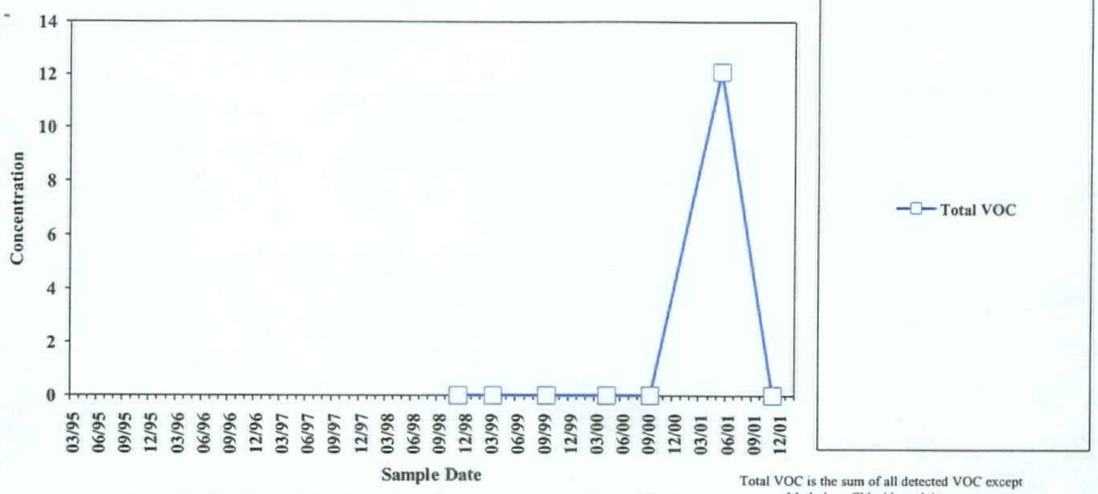
Sample concentration units: µg/L

Sample Location:

SW-13

Eastern Plume
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

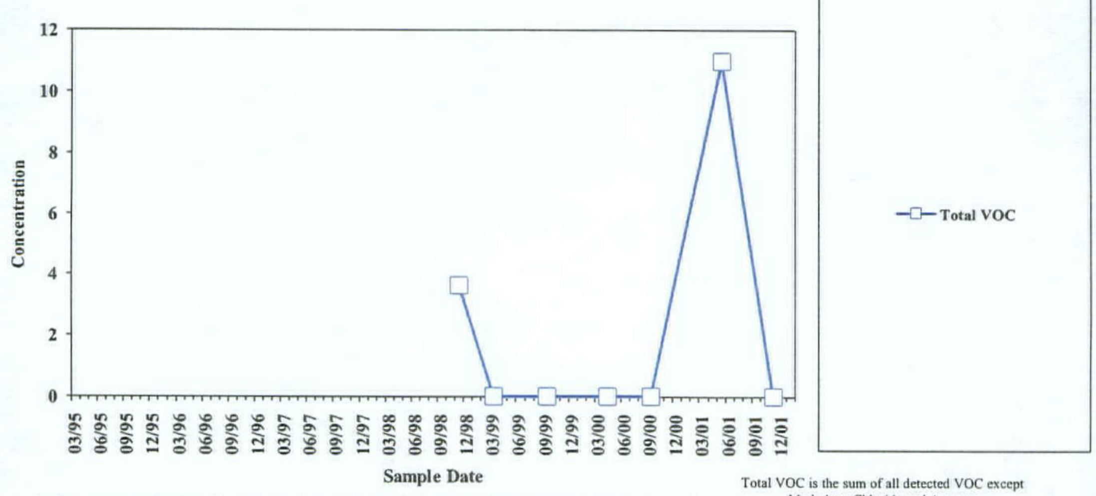
Sample concentration units: µg/L

Sample Location:

SW-14

Eastern Plume
Surface Water

Chemicals of concern: Volatiles



Analyte concentrations less than the sample detection limit are plotted as zero concentration on this chart.

Total VOC is the sum of all detected VOC except Methylene Chloride and Acetone.

Sample concentration units: µg/L

Appendix C

Response to Comments Received on the 2000 Annual Report and Monitoring Events 18 and 19 Reports

Appendix C.1

Response to Maine Department of Environmental Protection and U.S. Environmental Protection Agency Comments on the 2000 Annual Report

RESPONSE TO COMMENTS FROM THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION ON THE FINAL 2000 ANNUAL REPORT FOR SITES 1 AND 3 AND EASTERN PLUME NAVAL AIR STATION BRUNSWICK, MAINE

COMMENTOR: Claudia Sait **DATED: 4 October 2002**

We reviewed the final 2000 Annual Report for 1, 3, and Eastern Plume and are generally satisfied with the responses. However MEDEP still does not agree with the Navy's explanation for rising water elevations at MW-311 during 2000. Hopefully, continued monitoring in the Eastern Plume will provide the answer in time.

Response—Comment noted.

RESPONSE TO COMMENTS FROM THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION ON THE SITES 1, 3 AND EASTERN PLUME, 2000 ANNUAL REPORT NAVAL AIR STATION, BRUNSWICK, MAINE

COMMENTOR: Claudia Sait **DATED: 14 June 2002**

The Maine Department of Environmental Protection (MEDEP or Department) has reviewed the report entitled *Draft 2000 Annual Report, Monitoring Events 16 and 17, Sites 1 and 3 and Eastern Plume*, dated April 2002, prepared by EA Engineering, Science, and Technology. Based on that review, the Department has the following comments and issues.

GENERAL COMMENTS:

1. MEDEP notes and appreciates that additional care is being taken in accurately describing the current status of pumping effects and concentration trends.

   Response—Comment noted. The Navy is pleased that MEDEP finds this assessment acceptable.

2. In working with the water-level data files on the 2002 ArcView GIS Update CD, erroneous data and duplicate data for many entries were found. For example, MW-1104 has a water elevation of 26 feet for one day when all other values are in the mid-40 range. Such problems are commonplace, and the data points should be checked in the appropriate event reports to confirm. For this to be a useful tool the Navy or its consultant needs to thoroughly review and confirm the water levels entered on the CD.

   Response—The Navy appreciates MEDEP bringing this to our attention during a technical meeting. The data provided on the 2002 ArcView update CD contained some errors for a limited subset of monitoring wells, which have been corrected. A revised database file was distributed to site stakeholders by email to remedy this issue. Additional care will be taken when completing this database in the future.

SPECIFIC COMMENTS:

3. Figure 1-2, Location of Sites and Extraction Well Locations: The extent of the Eastern Plume does not match that of Figure 1-1 and other later report figures along the southern boundary. Figure 1-1 represents the state of knowledge in 2000. Therefore, for consistency the old boundary should be used in Figure 1-2.

   Response—For consistency, the Eastern Plume boundary shown in Figures 1-1 and 2-1 will be redrawn to match that represented in Figure 1-2, which is based on the most recent 2000 VOC data showing that the plume extends south of New Gurnet Road.

4. Table 1-2, Summary of the 2000 Long-Term Monitoring Program at Eastern Plume, p. 2 of 3: Information on EW-05A does not belong in the 2000 report, as it was not installed until September 2001. Footnotes (d) and (e) are also not pertinent. Please remove these entries.

Response—The Navy agrees with this comment. As EW-05A was installed in 2001, it has been removed from Table 1-2.

5. Table 1-2, Summary of the 2000 Long-Term Monitoring Program at Eastern Plume, p. 3 of 3: MEDEP could not find SEEP-10 or SEEP-11 on Figure 2-2. If missing, please add. Otherwise, describe their locations to facilitate locating them.

   Response—Seep samples SEEP-10 and SEEP-11 are located southwest of MW-207A, and were identified as locations of ground-water upwelling near the location of an old farmer's well. These locations were sampled during Monitoring Events 17 and 18 (during 2000), and noted no VOC concentrations; therefore, they have not been sampled since 2000. The two seep locations were inadvertently omitted from Figure 2-2. These sample locations have been added to the figure.

6. Section 2.1, Ground-Water Extraction and Treatment System 2000 Performance, Summary, p. 1 of 5, 3rd para: Extraction well EW-03 has remained inactive since identification of the well screen failure in December 1998. It would be appropriate to add that pumping at this location is no longer needed, and that the well will not be replaced.

   Response—The following sentence will be added to the bottom of the 3rd paragraph:

   > *Extraction well EW-05 has remained inactive since the identification of the well screen failure in December 1998. Pumping at this location was determined unnecessary, therefore, no replacement of this well is planned.*

7. Section 2.1, Ground-Water Extraction and Treatment System 2000 Performance, Summary, p. 2 of 5, 1st para: The cumulative VOCs removed from the Eastern Plume continue to show a relatively consistent rate of VOC removal during 2000. The word "continue" adds confusion to interpreting this statement. The rate of removal was fairly consistent for all months in 2000 except for July. But, in the perspective of the last 4 years, the 2000 monthly removal rates were quite low. The Navy needs to clarify what meaning it is addressing.

   Response—The sentence in Paragraph 1 on Page 2 of 5 will be edited to more specifically state that:

   > *The overall cumulative VOCs removed from the Eastern Plume continue to show a relatively consistent rate of VOC removal during 2000, with the exception of July when the VOC removal rate increased sharply. However, in comparison to the VOC removal rates during the last 4 years, the monthly removal rates for 2000 show a declining trend since 1998.*

8. Section 2.2, Water Level Gauging Program, p. 3 of 5, explanation of graph: The inset graph shows relationship between measured water elevation in MW-311 and the pumping rate of nearby extraction well EW-02A for the period of 1999 and 2000. The following statement is made: "The increasing water elevation at MW-311 is believed to be related to decreases in extraction well flow at EW-02A and the deactivation of EW-02 in September 2000."

Through September 1999, the Navy's interpretation appears valid, but after that the water elevation continues a relatively constant rising trend in MW-311 even through the extraction rate in EW-02A increases to higher values (18.4 and 18 gpm? [units not given]). Also, the deactivation of EW-02 in September 2000 does not make sense as an explanation, according to data presented in Table 2-1. Furthermore, since MW-311 exhibits confined aquifer behavior, one would not expect a time lag of months between cause and effect. On the other hand, MEDEP notes the following items which could potentially affect heads in the general area: (1) EW-01 extraction rate progressively dropped from 11.6 gpm in January 1999 to 4.1 gpm in September 2000, (2) in 1999 a long-term precipitation deficit began which would tend to oppose the MW-311 rising trend, and (3) well integrity problems at MW-207A (located 500 feet west of MW-311) where head elevation has been above land surface. Please review this situation, and modify/expand on the explanation.

Response—The Navy believes the water elevation at MW-311 has been directly tied to the pumping rate at EW-2A. A cause and effect relationship between pumping rates at EW-2A and corresponding water elevation at MW-311 has been well established. The Navy also believes that water elevation changes at MW-311 are most likely to be the result of short-term changes in pumping at EW-2A. Note that short-term pumping rate changes could be occurring at EW-02A that may not be noticeable during monthly flow system operations. The Navy feels it is likely these short-term flow changes could be responsible for the ground-water elevation changes being noted at this well. It is unlikely that any quantifiable effects of pumping rate changes at EW-1 could affect water elevations at MW-311 as it is outside the area of influence of EW-1. If some sort of head change at MW-207A was occurring (and no evidence has been collected to support this), the Navy does not feel that any possible pressure release from the deep aquifer at MW-207A would affect the elevation at MW-311.

The text will be rewritten as follows:

> *The primary reason for the increasing water elevation at MW-311 during 2000 is believed to be related to decreases in extraction well flow at EW-02A, and the deactivation of EW-02 in September 2000. Other extraction wells could be affecting water elevations at MW-311, as this well is screened in a confined aquifer.*

9. Figure 2-5, Water Elevations within Sites 1 and 3 Landfill: The present graphs indicate that, in general, shallow groundwater levels and the deeper potentiometric head are continuing to seek a lower equilibrium level. Although levels in two shallow wells, (MW-210B outside the slurry wall, and EP-16 inside the slurry wall) located near each other in the southeast part of Site 3, rebounded several feet during 1998 and 1999. The difference in well screen elevation between shallow and deep monitoring wells is only a few tens of feet. Also, a vertical line indicating when pumping of EW-6 and EW-7 ceased should be added. What is the Navy's explanation for the rebound in one locality, and continued decline in other areas within the slurry walls?

   Response—The Navy agrees that some rebound is occurring, but this is not unexpected, nor does it suggest that the cap and slurry wall at the site are ineffective. The minor amount of rebound in water elevations noted in these wells could be related to process occurring within the landfill, such as the long-term transition of water vapor to pore water/ground water as vapors condense inside the capped landfill. When the data set of the wells located inside the landfill is reviewed, it is clear that the placement of the cap and slurry wall have dramatically decreased water elevations within the landfill. A line has been added to Figure 2-5 showing when extraction well pumping was terminated at EW-6 and EW-7 (November 1997).

10. Section 3.1, EW-01, 1st para: In 2000, the pumping rate in this well declined significantly (6.2 gpm first half to 3.8 gpm second half). Was this fluctuation controlled by the plant operator to limit drawdown in the well, or did it occur automatically in response to system line pressure and was not directly related to the well production performance?

    Response—According to the extraction well log sheets from 2000, EW-01 was producing 7.4 gpm at the beginning of the year, as measured by the flowmeter at the well. The flow gradually decreased to 5.9 gpm by 30 June 2000. There were no operator actions that would cause this decrease, therefore, the Navy attributes the decrease in ground-water flow rates or increased hydrostatic pressure in the force main to other extraction well flow adjustments.

    Extraction well flow measurements are made by reading the GWETS plant influent flowmeter, first shutting down all wells, then starting each well individually to obtain a flow value. This method has some inherent inaccuracies that could affect the flow rates noted for the extraction wells. While the Navy believes the flow rates noted for each extraction well are close to the actual values, a variation estimated at +/- 1 gpm could be expected.

11. Section 3.1, EW-02 and EW-02A: The term "abandoned" should be replaced by "decommissioned in accordance with State of Maine regulations," as MEDEP assumes this was the case. Please make the same editing for EW-03 on the next page.

    Response—The word "abandoned" will be replaced with "decommissioned in accordance with State of Maine regulations," as noted above.

12. Section 3.1, EW-04, 2nd bullet: The closest monitoring well to EW-04 is MW-330, approximately 200 feet east. MW-330 is screened at shallow depth just above clay overlying a bedrock high. However, it is mapped as being within the solvent plume, although the well has never had a laboratory detection of any contaminant of concern. The plume occurs at a lower elevation than the MW-330 screen, and likely migrated around this low permeability feature. The technical members should discuss whether the plume outline should be adjusted to reflect this geological control.

    Response—The screen interval of MW-330 lies within a predominantly clay unit, under the shallow sand unit. The deep sand interval (and hence the solvent plume) does not appear to be present at this location, possibly due to the geologic control mentioned in this comment. The Navy is willing to discuss this issue.

13. Section 3.1, EW-05, 3rd bullet: Elsewhere in this report the date for decommissioning of EW-05 is given as January 2001. If this is the case it should not be included in the 2000 Annual Report. Please confirm and either delete or correct.

    Response—The text of this section has been changed to note the decommissioning of this well occurred in January 2001. Although technically outside the scope of this 2000 Annual Report, the Navy feels noting this event will aid in the readers' understanding of the program.

14. Section 3.2.1, Ground-Water Flow - General Observations: MEDEP cannot endorse the Navy's theory without the results of the proposed field investigation scheduled for the summer of 2002.

    Response—The Navy continues to believe the description of ground-water flow is consistent with existing data. The Navy anticipates discussions will be held following the completion of additional monitoring wells in the Southern Boundary area, and that these additional data will provide sufficient data to confirm or refute our hypothesis.

15. Section 3.2.1, Ground-Water Flow - General Observations: A fifth bullet needs to be added that would read similar to the following:

    > *Precipitation, and very likely groundwater recharge, was significantly below normal in 2000. Precipitation was __ inches below the long-term average of __ inches. It is possible that low recharge affected the plume concentrations at some wells. For instance, at MW-319 the highest concentration of PCE was recorded since monitoring began in 1995. At MW 205, the highest concentrations of TCE and 1,1,1-TCA were measured for the 6-years of record.*

    Response—While the Navy agrees that a note should be included regarding the low amount of recharge during 2000, we do not feel that any direct relationship between decreased recharge and increased concentrations can be proven at this time. In fact, total VOCs at monitoring well MW-205 fall within the historical range during 2000, which does not support this hypothesis. The following text will be added to this section:

Precipitation, and very likely ground-water recharge, was significantly below normal in 2000. The effect of the drought conditions on ground-water flow patterns does not appear to be significant, although many monitoring wells showed lower water table elevations during this time period.

16. Section 3.2.2, Effects of Remedial Measures - Sites 1 and 3, 2nd bullet: The interpreted 21-ft contour potentiometric surface lines in the deep interval downgradient of the landfill are deflected toward the southern end of the Sites 1 and 3 landfill. The presence of these remedial structures has resulted in an area of lower head downgradient of Sites 1 and 3. Because the annual report does not contain a figure that shows potentiometric contours a reference must be provided.

    Upon close scrutiny of the deep potentiometric contour maps in Monitoring Event 16 and 17 reports, deflections representing low downgradient heads due to the landfill remedial structures are not evident, and therefore MEDEP is puzzled by the above statements. The April and September contours (in particular the 21-ft lines) are quite dissimilar. MEDEP would not draw the 21-foot contours as shown on either map. The statement should be better explained, or removed.

    Response—A reference to the deep ground-water potentiometric surface maps (Figure 6 in Monitoring Events 16 and 17 reports) has been added to this sentence. The Navy continues to believe the placement of the landfill has caused a decrease in the water elevations immediately downgradient of Sites 1 and 3, as recharge is limited especially in the areas upgradient of MW-220 and MW-218. The Navy would be interested in discussing with MEDEP during a technical meeting how they envision contouring these data. To clarify this conclusion, the following text will be added:

    First sentence:

    *...show a trough in water elevations **especially at MW-218 and MW-220 compared with nearby monitoring wells.***

    Second sentence:

    *...toward the southern end of Sites 1 and 3 landfill **in the direction of MW-220.***

17. 3.3.2.1, Volatile Organic Compound Concentrations and Distribution, p. 3-8, 6th bullet: Samples from 5 monitoring wells (MW-205 [deep], MW-225 [deep], MW-313 [deep], MW-331 [deep] and MW-333 [deep]) showed an increase in total VOC concentrations based on data collected in 2000. MEDEP notes the following new highs from Appendix A-3:

    - Total VOCs and 1,1,1-TCA concentrations in MW-205 for the April 2000 sampling were the highest since measurements began in 1995.

    - Total VOCs and 1,1-DCA and 1,1-DCE concentrations in MW-313 for the September 2000 sampling were the highest since measurements began in 1995 although not above the MCL/MEGs.

- Total VOCs and PCE concentrations in MW-319 for the April 2000 sampling were the highest since measurements began in 1995.

- 1,2-DCE concentration in MW-331 for September 2000 sampling was the highest since measurements began in 1998.

- Total VOCs and 1,2-DCE in MW-333 for September 2000 sampling were the highest since measurements began in 1998 although not above the MCLs/MEGs.

The locations of these five monitoring wells are wide-spread in the southern "lobe" of the Eastern Plume. The only apparent explanation at this time is that the precipitation drought may have reduced groundwater migration rates and subsequently reduced dilution of contaminants.

Response—The Navy agrees with these observations. Each of the notable results listed above will be better explained by reviewing the upcoming monitoring event data at each monitoring location. Some of these trends may be the result of the drought during 2000, although a plausible explanation could be the leading edge of the Eastern Plume is moving slowly to the south. It is also important to note that in addition to the "new high" VOC concentrations noted above, several wells noted new lows for total VOCs, including MW-311, EW-2A, MW-224, and MW-NASB-212. These wells are located in the northern and central portion of the Eastern Plume, suggesting plume reduction due to extraction is occurring. Note that data collected during future monitoring events will assist in clearly establishing long-term trends for these wells, and whether the drought noted during 2000 was responsible.

18. Section 3.4.1.2, Eastern Plume, p. 3-9, last sentence: ...VOCs from the Eastern Plume do not appear to be impacting surface water. Please rewrite as

    VOCs from the Eastern Plume do not appear to pose a human health or environmental risk to surface water.

    Response—The edited sentence will read as follows:

    The long-term monitoring surface water sampling results collected during 2000 reaffirm that VOCs from the Eastern Plume do not appear to pose a human health or environmental risk to surface water.

19. Section 3.6.3, Additional Data Collection and Review, p. 3-13, 1st bullet: ...or whether the geologic units which act as preferential flow conduits in the Eastern Plume may naturally contain contamination migration. MEDEP is uncomfortable with this statement. Please explain how the first condition (flow conduits) is compatible with the second condition (contain contamination). On the basis of data through 2000, a prominent trough in the top of clay has been identified that heads towards Harpswell Cove and is filled with silty sand or fine sand laminations. It is difficult to conceive that this geologic environment can hydraulically contain a plume. The current remedial pumping has not created plume-wide inward gradients, according to potentiometric maps in the monitoring event reports.

Possibly, plume concentrations may be attenuating sufficiently before discharging to downgradient surface water. The direct-push investigation hopefully will further refine geologic definition and help answer the degradation issue.

Response—As previously discussed with MEDEP during meetings, the potential presence of VOCs containing geologic units in the Southern Boundary is being investigated. Data available to date suggest that VOCs are not migrating through the overburden, and that a change in lithology may occur in the Southern Boundary that naturally limits the flow of ground water to the south. The Navy is actively working with site regulators to address this issue, and additional monitoring wells that are planned in September 2002 are likely to confirm or refute this hypothesis.

20. MEDEP agrees with the Navy's recommendations in Section 3.6.

Response—Comment noted.

RESPONSE TO COMMENTS FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY ON THE DRAFT 2000 ANNUAL REPORT FOR SITE 1, 3 AND THE EASTERN PLUME, NAVAL AIR STATION BRUNSWICK, MAINE

COMMENTOR: Michael S. Barry **DATED: 23 May 2002**

Thank you for the opportunity to review the above referenced report which was submitted by EA Engineering, Science, and Technology on behalf of the Navy and received on 16 April 2002. EPA's specific comments are brief and focus upon the report recommendations in anticipation of the 2001 Annual Report in the near future.

1. *Section 3.6.1, Diffusion Samplers*. Comment to these proposals has been in separate correspondences to date. EPA would support integrating the diffuser sampling program within the existing event/annual reports if so proposed by the Navy.

   Response—Comment noted.

2. *Section 3.6.2, Extraction System Refinement*

   a. Concur with replacing pump motors and heads for EW-01 and 04 as the declining pumping rate of EW-1 has been noted (this is expected over time). We assume that periodic pump maintenance/replacement to maintain pumping rate is a detail in the O&M plan and that usually items such as this are performed as a matter of course, noted on the monthly/annual reports and need not wait for the recommendation/comment/response process in the annual reports to execute. Perhaps general plant operations, in that what the Navy expects/desires regulator comments prior to implementation and what evolutions should merely be noted after performance, should be discussed at a future meeting. In general, EPA assumes that the plant will be operated in accordance with "good operational practice" and has no desire to micro manage plant operation.

      Response—Comment noted.

   b. Concur with "surging" pump operation at EW-02A in an overall program sense. Details regarding surging operation can be discussed in meetings and executed in a more informal manner than through the annual report recommendation/comment/response process.

      Response—Comment noted.

3. *Section 3.6.3, Additional Data Collection and Review*

   a. EPA has no issue with using the Navy's Monitored Natural Attenuation (MNA) protocol as a starting point for evaluation as long as it is not inconsistent with the EPA MNA Guidance (OSWER Directive 9200.4-17P, dated 21 April 1999; available at: www.epa.gov/swerust1/directiv/d9200417.pdf).

Response—Comment noted and appreciated.

b. EPA concurs with assessing the potential for MNA as a remedy at the Eastern Plume, especially as parts of the plume are "flat-lining" despite extraction system optimizations. A factor in EPA's advocacy for the recent work on the plume southern boundary and at site 11 has been to support higher confidence in all plume migration pathways in anticipation of a potential future MNA remedy.

   Response—Comment noted. The Navy looks forward to beginning development of an appropriate monitored natural attenuation program at the Eastern Plume in conjunction with EPA and MEDEP.

Appendix C.2

Response to
Maine Department of Environmental Protection
and U.S. Environmental Protection Agency
Comments on Monitoring Event 18 Report

RESPONSE TO COMMENTS FROM THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION FOR SITES 1, 3 AND THE EASTERN PLUME, MONITORING EVENT 18, APRIL/MAY 2001, AT NAVAL AIR STATION, BRUNSWICK, MAINE

COMMENTOR: Claudia Sait **DATED**: 6 February 2002

GENERAL COMMENTS

1. MEDEP will reserve comments involving more detailed analysis and comments on the implications of large-picture data interpretation for our review of the 2000 and 2001 Annual Reports. (NR)

   Response—Comment noted.

SPECIFIC COMMENTS

1. ***Section 1.2.2, Results, Page 4, Top***—The depth of ground water during April 2001 at monitoring well EW-6 was 36.02 ft mean sea level, which indicates, at this time, that the ground-water potentiometric surface is rising above the bottom of the waste mass at this location (i.e., EW-6 as shown on Figure 5)."

   EW-6 is the only well within the landfill containment that has a water level this high – above the base of the filled debris. The water level has been at this elevation since at least 1998, according to tables in prior monitoring event reports. Therefore, it is not correct to say that the water level is rising. EW-6 is screened from 17 to 41 feet below land surface, a substantially longer screen than those of nearby wells. In 1999, the Navy reported that the EW-6 well vault was found to contain standing water. It appears that this well is not representative of conditions within the landfill containment, and as stated on page 10 of this report, standing water was observed in the EW-6 vault. Possibly surface water is entering the well and creating a small groundwater mound at this location. The well and vault must be closely inspected for integrity, and repairs made as appropriate. (RR)

   Response—Comment noted. The water level does not appear to be rising at monitoring well EW-6. The well vault, however, will be inspected to determine the source of surface water leakage and, if necessary, will be repaired.

2. ***Section 1.3.1, Field Activities, Page 4 and Table 5***—Extraction well EW-1 has been dropping substantially in remedial pumping rate during the past several years. In the summer of 1999 its extraction rate was approximately 11 gallons per minute (gpm). In April of 2001, the rate is given in Table 5 as 2 and 3 gpm prior to be taken off-line for redevelopment in May, which took 15 days to bring back on-line. As a result of the reduced pumpage from EW-1, its capture zone in Figure 7 appears to be less than 50-foot radius. As this is the only extraction well that addresses the southern end of the Eastern Plume, MEDEP is concerned that there has been very little hydraulic capture of the plume at EW-1. This scenario means that the chlorinated solvents in groundwater in the toe area of the plume may not been contained by remedial pumping, therefore, one of the objectives of the ROD is not being

achieved. (As previously stated, the MEDEP does not believe that the plume is contained by natural geologic features, such as a bowl in the deep clay surface.) In the future, the Navy needs to be more diligent in maintaining the design pumping rate of remedial extraction wells. (RR)

Response—Comment noted. In April 2001, the pump and pump piping at extraction well EW-1 were inspected by EA's technician and treatment plant operator. The inspection found that the pump needed to be replaced and that the piping had significant iron deposited within the interior of the pipe (approximately 25-30 percent of the pipe's diameter was open to permit the flow of water). The reduced piping diameter added to the decreased pumping rate, combined with the need to replace the pump. The piping and pump were replaced; and upon startup, the well was observed to have a significant amount of suspended iron. Therefore, the well was redeveloped to remove the iron from the well. The pumping rate returned to a range of 8-11 gal per minute. In the future, the wells will be inspected to maintain the optimum pumping rate to assure maximum and efficient plume capture.

3. ***Section 1.3.2, Water quality Indicator Parameter Measurements***—It appears that the elevated turbidity reading may be a result of retrieving the diffusion samplers and reinstalling the sampling pump.

   The Navy needs to actively seek to resolve this situation regarding the dual use of diffusion samplers and low-flow sampling by pulling and resetting a down-well pump. Although elevated turbidity is not known to affect chlorinated hydrocarbon concentrations, if samples for biologic attenuation are collected during the monitoring events, pumped water with elevated turbidity likely would pose a QA/QC issue. (RR)

   Response—The sample turbidities will continue to be tracked and particularly monitored to assess whether the physical retrieval of the diffusion samplers and pump installation is directly associated with adding to the sample turbidity. If, in the future, samples were required for biologic natural attenuation monitoring, additional care and possibly additional settling times may be required.

4. ***Section 1.3.3.3, Comparison of Low-Flow Versus Aqueous Diffusion Collected Samples, Page 6, Bottom Bullet***—Temperature and conductivity were higher in low-flow samples as opposed to diffusion samples for all wells.

   These data verify that the low-flow pumping system significantly warms ground water prior to temperature measurement acquisition at the surface. The amount of warming observed in the past has been over 5 degrees C. Such non-representative data should be distinctly qualified in future monitoring event reports. MEDEP recommends that temperature and conductivity be measured using the diffusion sampling technique, but cautions that warming of diffusion samples in the summer sun must be avoided. (ED)

   Response—Comment noted. For monitoring events that occur on hot summer days, the diffusion bag samples will be placed out of the sun at all times to avoid warming effects.

5. ***Section 1.3.3.4, Ground-Water Extraction and Treatment System, Page 7I***— There were no elevated dissolved oxygen concentrations (9 mg/L) recorded in 3 or 4 active extraction wells sampled or in the combined effluent.

   Please explain the importance of this comparison. In the past, dissolved oxygen levels in groundwater pumped from the extraction wells have been at or above oxygen saturation levels, as could be expected. (RR)

   Response—Dissolved oxygen concentrations in ground water may be affected by temperature as well as other natural factors in addition to the physical pumping of the well. The dissolved oxygen concentrations of the active extraction wells will continue to be tracked closely for natural fluctuations and/or effects of pumping.

6. ***Section 1.4.1, Sampling Activities, Page 8***—Other sections of this report addressing sampling or field activities provide the numbers of samples taken of various types. This section does not. Please revise the text to provide the numbers of samples taken from the Eastern Plume and at Sites 1 and 3. (ED)

   Response—Comment noted. The Monitoring Event reports have been issued as final. However, this comment will be considered for the upcoming April 2002 Monitoring Event reports which will be issued as Draft and Final reports. Future reports will allow for regulator comments to be addressed and revisions made to the final versions of the reports.

7. ***Figure 6, Interpreted Deep Ground-Water Potentiometric Surface Contour Map***—

   a. This figure shows contours south of Mere Brook oriented such that groundwater flow would be eastward or northeastward. MEDEP does not agree that deep groundwater flows this general direction, for the reasons given in our comments on "Summary Report of the Direct-Push Investigation of the Southern Boundary of the Eastern plume and Site 11, Naval Air Station, Brunswick, Maine – September 2001". This should be resolved so that this does not become a recurring comment. (MTG)

      Response—This topic will be discussed at an upcoming Technical Meeting.

   b. Potentiometric contours are shown surrounding all extraction wells except for EW-5A. Contours surrounding all extraction wells are displayed in Figure 7 in greater detail. It appears that EW-5A was overlooked in Figure 6. Please add these contours, as shown in Figure 7. (ED)

      Response—The Monitoring Event reports are issued as final. However, this comment will be considered during the preparation of the April 2002 Monitoring Event ground-water flow maps.

8. ***Figure 9, Interpreted Total Volatile Organic Compound Concentration Contour Map, Shallow Wells, Monitoring Event 18***—Concentrations of daughter breakdown compounds of the Eastern Plume parent compounds are higher at sentinel monitoring well MW-313 than in the past, but are not close to the MCLs/MEGs. Further comment will be provided when the 2001Annual Report is distributed should this trend continue for Monitoring Event 19. (NR)

   Response—Comment noted.

9. ***Figures 9 & 10, Interpreted Total Volatile Organic Compound Concentration Contour Maps, Shallow Wells and Deep Wells, Monitoring Event 18***—Some shallow and deep well total VOC results shown on these figures are entirely due to the laboratory-reported presence of the compound 2-butanone. At some of these locations, prior monitoring event contour maps have not shown any VOC detections.

   In Appendix C (Analytical Data Quality Review), a statement near the bottom of page C-4 says that positive results for 2-butanone in MW-311, MW-332, MW-331, and MW-319 should be considered estimated with a high bias. On page C-9, another statement says that the results for 2-butanone in MW-225A (shallow and mid), MW-NASB-212 (shallow), MW-305 (shallow, mid and deep), and P-132 (mid) should be considered estimated. Table 13 indicates that the reason for this qualification is either accuracy or precision criteria assessment. Apparently, 2-butanone was not found in laboratory, trip, equipment rinsate, and field blanks. No mention of the 2-butanone finding occurs in the main text. However, the following statement in Section 1.6 might lead an outside reader not to question whether 2-butanone really exists in the subsurface groundwater: The data obtained during the April 2000 sampling event were determined to be of sufficient quality to be used for the objectives specified in the Final LTMP (EA 2000a).

   Response—This topic will be researched and discussed at an upcoming Technical Meeting.

   MEDEP doubts that 2-butanone "just arrived" at numerous wells distributed throughout the Eastern Plume, a few of which are sentinel wells. From table A-3, 29 diffusion collected samples contained 2-butanone, with concentrations ranging from 3 to 8 μg/L. None of the 29 low-flow collected samples were analyzed as containing 2-butanone. These statistics point to the diffusion bags as affecting the detection of this compound. The Navy needs to research this problem, and discuss a proposed solution with the technical team. (RR/MTG)

   Response—This topic will be researched and discussed at an upcoming Technical Meeting.

10. ***Table 7, Summary of Water Quality Indicator Parameters Measured in Low-Flow Samples, P-111 Temperature***—The temperature of the sampled groundwater pumped from piezometer P-111 is reported at 4.31 °C. This temperature is a few degrees colder than normally expected. The next lowest groundwater temperature reported in this report is 5.53 °C at MW-332. Both the piezometer and the well are screened shallower than 20 feet bgs, and both are located between a stream and an extraction well. Possibly, cold surface water in the winter months served to recharge the shallow aquifer and migrated under pumping drawdown to the piezometer and well. (NR)

    Response—Comment noted.

RESPONSE TO COMMENTS FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY ON THE MONITORING EVENT 18 REPORT FOR SITES 1 AND 3 AND EASTERN PLUME NAVAL AIR STATION BRUNSWICK, MAINE

COMMENTOR: Michael Barry **DATED: 15 February 2002**

Thank you for the Monitoring Event 18 report for Sites 1, 3 and the Eastern Plume at NAS Brunswick.

I have no formal comments that require a response at this time; I will reserve comment until the 2000 annual report on VOC trends, recommendations, issues, etc.

I have several informal observations on the Event 18 report:

1. There were a lot of low level "erroneous" detections of acetone and 2-butanone. As these are not COC's and are likely an artifact of the sampling method or analytical method, these do not appear to be actual detections to me. Otherwise one would have to conclude that the "sentinel" wells are now plume edge wells.

2. The wells gauged indicate deep flow to the north/northeast south of New Gurnet Road. This is an interpretation that EPA/MEDEP have had ongoing issue with in that we think more/other points would indicate flow deep flow to the south. I hope finalization of the 2001 field work report will resolve one way or the other. Until that time I will merely note the issue and not expect a response.

3. Please count this email as my comments to the event 18 report.

4. Also please regard my 26DEC01 email as comments to the event 18 report for site 9.

Response—Comments noted.

Appendix C.3

Response to Maine Department of Environmental Protection and U.S. Environmental Protection Agency Comments on Monitoring Event 19 Report

RESPONSE TO COMMENTS FROM THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION FOR THE MONITORING EVENT 19 OCTOBER/NOVEMBER 2001 REPORT DATED MAY 2002 FOR SITES 1 AND 3 AND EASTERN PLUME, NAVAL AIR STATION, BRUNSWICK, MAINE

COMMENTOR: Claudia Sait **DATED: 24 July 2002**

GENERAL COMMENTS

1. *Contaminant Rebound at End of Extraction Shutdown*—MEDEP has studied the October 2001 (ME-19) contaminant concentrations in relation to concentrations reported for April 2001 (ME-18), and what changes occurred as a result of the extraction well shutdown for 50 days. The comparison showed a wide range of response, and some surprises, as follows:

   - MW-229A: Total VOCs plummeted to about 1/40 of April value (from 83 to 2 μg/L). This well is approximately 150 feet south of EW-01.
   - EW-04: Total VOCs dropped to about 1/3 of April value.
   - MW-319: Total VOCs dropped to about 1/2 of April value.
   - MW-311: Total VOCs remained nearly unchanged, however, the dominant solvent dramatically switched from TCE to 1,1,1-TCA after shutdown (1,1,1-TCA went from 170 to 3 μg/L).
   - EW-02A: Total VOCs and solvent composition did not change much.
   - MW-105A: No VOCs were detected for both events.
   - MW-205: Total VOCs increased to about 1.5 times the April value (a new record high).
   - MW-225A: Total VOCs increased 3 times the April value.
   - MW-331: Total VOCs increased 3^+ times the April value. 1,2-DCE increased nearly 6 times. October total VOCs slightly exceeded the highest on record when sampling began in November 1998 after well was installed. (NRR)

   Response—The Navy agrees that changes noted in VOC concentrations after the cessation of pumping are complex (as summarized in this comment). Of all the changes noted in the Eastern Plume following the cessation of ground-water extraction, the Navy believes the most significant are those in the southern end of the plume (i.e., near MW-205 and MW-231B). The additional monitoring wells planned in the Southern Boundary are likely to shed further light on the degree of impacts in the Southern Boundary area, and will provide sentinel wells downgradient of the plume. While a quantitative reason for each concentration change noted in this comment is unlikely, the Navy would be interested in discussing these data during a technical meeting with site stakeholders, possibly during discussions related to the location of a replacement extraction well for EW-1.

2. ***Plume Capture Concerns in MW-205 Area***—The above information when viewed with data in the 2001 direct-push investigation has prompted a concern that more plume contamination is apparently present in the MW-205 area than previously recognized. In light of the declining pumping rate at EW-01 and evidence from past potentiometric maps indicating its capture zone does not extend even half way to MW-205, an apparently significant mass of VOCs has not been addressed by past remedial pumping. MEDEP understands that the Navy is planning to redesign EW-01, which has a well screen of 78 feet, to eliminate drawing from both the uncontaminated shallow and contaminated deep sandy zones. Such optimization of plume extraction in this area is encouraged, and with this in mind, the Navy should explore the benefits of moving EW-01 into the MW-205 vicinity. MEDEP, in consultation with EPA, can be ready to present our analysis of geologic and chemical data in support of relocating EW-01 at the next technical meeting. (RR/MTG)

   Response—The Navy agrees that this topic should be discussed in detail during an upcoming technical meeting, and would look forward to hearing MEDEP's and EPA's analysis of geologic and chemical data mentioned in this comment. The concentrations of VOCs that may be present near MW-205 may warrant the placement of an extraction well, although a case can be made for locating the extraction well in other areas as well. The Navy believes that additional study and discussion will be needed before the location of the replacement extraction well could be identified. Also, the concentrations at MW-205 reported during the September 2001 sampling event (469 μg/L) are within the historical range reported at this well and, therefore, the statement that "more plume contamination is apparently present in the MW-205 area than previously recognized" may be overstating the historical significance of the recent sampling event.

SPECIFIC COMMENTS

3. ***Section 1.2.2, Results, Page 4, Last Sentence of Top Paragraph***—As pointed out in our comments for Monitoring Event 18 Report (Comment 2), the water-level trend in EW-06 has been quite unusual as far back as 1998. As stated in our earlier comment the well and vault must be closely inspected for integrity, and repairs made as appropriate. Until this is done the data from this well is questionable for Site 1 & 3 evaluations. (RR)

   Response—The Navy would be interested to hear more from MEDEP regarding what is considered "unusual" about the water elevations at EW-6. Data from this well show variations during 1998-2001, but those variations are within historical ranges. The well and vault of this well will be inspected in a detailed fashion during the September 2002 sampling event in an attempt to determine if any surface anomalies can be identified that may need repairs. The well is inspected during each monitoring event and, to date, no problems have been reported. The results of the additional inspections will be detailed in the next monitoring event report.

4. ***Section 1.3.2, Water Quality Indicator Parameter Measurements, Page 5, 3rd Paragraph*—**

   a. It should be noted that 10 of 28 monitoring wells sampled within the Eastern Plume were sampled with diffusion samplers only, and, therefore, only one set of water quality parameters was collected in-well following ADS of those 10 monitoring wells.

      Historically, just one set of water quality parameters has been collected per well, therefore the fact that two sets of parameters (reported in tables 6 and 7) were collected in 15 wells should be emphasized, and the reason given in this paragraph. (ED)

      Response—Only one set of ground-water parameters was collected from these wells (as noted in the report) and, therefore, the question in this comment is unclear. Tables 6 and 7 summarize the water quality parameters for Sites 1 and 3 and Eastern Plume, respectively. The data cited in this report are consistent with those cited in previous reports and, therefore, we are unclear about the question posed in this comment.

   b. The elevated turbidity is not expected to affect the quality of the sample data because it is consistent with previous monitoring event data.

      Technically, the rationale given is not sound. The following wording is suggested: "The elevated turbidity is consistent with previous monitoring event data, and therefore, long-term concentration trend evaluations can be performed to indicate general trends. However, comparisons with data from monitoring wells with less than 10 NTUs of turbidity could be questionable for certain parameters." (ED)

      Response—The Navy believes the overall point made in the report text is accurate, i.e., samples that note turbidity of 10 NTUs or greater can be used to evaluate long-term trends in VOC concentrations. Note that the chemicals of concern (VOCs) are not likely to be affected by the slight increases in turbidity noted in Eastern Plume wells. The Navy agrees that the text used in the report can be improved, and will use the recommended text as follows:

      > *The elevated turbidity is consistent with previous monitoring event data and, therefore, long-term concentration trend evaluations can be performed to indicate general trends.*

      However, the Navy believes the second sentence in the recommended text overly degrades the usefulness of the data collected and, therefore, that text will not be added to future reports.

5. ***Section 1.3.3.4, Ground-Water Extraction and Treatment System, Page 7, Only Sentence***—The reason given for not collecting water quality indicator parameters does not appear valid, as VOC samples were collected from these wells on November 19, 2001 and are reported in Table A-4. What was different between this date and April 30, 2001 (ME-18) that prevented collection of indicator parameters? (RR)

Response—The Navy agrees that this statement is not accurate. Field parameters were not recorded when extraction wells were sampled because some new field personnel were utilized during this sampling event. Similar errors in the future will be avoided.

6. ***Section 1.5.1, Inspection Activities, Page 10, 1st Bullet—Some settlement was noted in the vicinity of MW-217A. Further investigation is warranted to determine the cause of this subsidence.***

   Reporting more information on what was observed in the field is also warranted. The Navy should report the depth of the subsidence and the diameter of the area affected. Is the integrity of MW-217A in jeopardy? Items like this are routinely reported and should be discussed at the Technical Meeting following the monitoring event. (RR)

   Response—The settling near MW-217A was minor, and is not a problem that is likely to affect the integrity of the monitoring well. The Navy agrees that additional description should have been provided in the report, and additional details will be added as necessary in the future. If significant issues regarding well integrity are encountered that may impact the reliability of wells, the Navy will discuss this issue during a technical meeting as noted in the comment.

7. ***Section 1.7 Analytical Data Quality, Review, Page 11***—With consideration of the data qualifiers and notes provided in Appendix C, the data represented in this report were found to meet specified acceptance criteria and, therefore represent data in compliance with the Quality Assurance Project Plan (EA 2000a).

   Notable findings of the analytical data quality review are summarized in Table 13.

   Table 13 consists of 4 pages of false-positives, estimated, estimated bias low, and estimated bias high qualifiers that involve nearly every well sampled and include contaminants of concern, such as 1,1,1-TCA, TCE, PCE, and benzene. Whether the many instances of methylene chloride and acetone false-positives due to various types of blank contamination should be reported as "notable findings" needs to be decided by the technical committee members. MEDEP requests that the topic of data quality be scheduled for an upcoming technical meeting to develop a common understanding of when data would be out of compliance according to the QAPP, and compare this with recent monitoring event reports. (MTG)

   Response—The Navy agrees that the technical committee members should discuss and develop a common understanding of the data quality and compliance as per the site QAPP. The Navy looks forward to discussing this issue at an upcoming technical meeting that could be held prior to the completion of the Monitoring Event 21 Report.

8. ***Figure 5, Interpreted Shallow Ground-Water Potentiometric Surface, October 29-30, 2002***—The contouring around two monitoring wells (EW-01 and MW-225B) is unexpected and almost certainly does not accurately represent shallow groundwater in these localities. Potentiometric contours indicate a 7-8 foot deep "sink" around MW-225B, and contours drawn around EW-01 indicate a 7-8 foot deep mound. Hydraulically, both are highly

unusual features, not previously recognized. In light of the September 11 shutdown of the extraction well system, heads in the groundwater system have generally recovered between 6 and 8 feet during the 50 days prior to the Event 19 water-level measurements. MEDEP makes the following observations, and asks for the Navy's interpretations in the Annual Report.

a. The mound around EW-01 is likely due to the confined pressure head of the lower sand dominating within the 78-foot long screen. EW-01's potentiometric elevation would fit nicely with the deep groundwater contours (Fig. 6). It seems that EW-01 should be removed from use with shallow potentiometric mapping (i.e., Figure 5).

   Response—The Navy agrees with this comment, and will provide a similar interpretation in the annual report. In the case of EW-1, it is likely that water elevations for this well in the shallow interval are reflective of ground-water conditions, especially when the well is not pumping. However, the Navy will not include extraction well elevations in future shallow maps, as the screens of other extraction wells do not extend into the shallow aquifer.

b. The sink around MW-225B is difficult to explain at this time. The water level has fluctuated within a 10-foot range since 1999, with no correlation to season. In October 2001, its water elevation does not fit with any surrounding data for either the shallow or deep groundwater zone. No recovery from the pumps being off was realized, in fact, the level was extremely low, compared to past data. The two "easiest" explanations are that (a) false levels have been inadvertently measured (moisture on riser), or (b) a well is being periodically pumped at the Weapons Compound, and that this well's drawdown reaches out elliptically towards MW-225B. If such a well exists and was used during the September 11 to November 13 shutdown this may also explain the water level in MW-220, just north of the Compound, which was also depressed about 5 feet from what Figure 6 contours would suggest (it was apparently ignored in drawing contours).

   In order to eliminate the possibility of a well in the Weapons Compound Area it is essential that the Navy determine and state for the record whether there is a well for the Weapons Compound Area and if there is get the location, depth and rough monthly volume pumped. (RR)

   Response—There is no well in the Weapons Area, or other potential "sink" of ground water. The data recorded at MW-225B are likely due to field measurement error, and these data should have been flagged as unreliable on this map.

9. ***Table 4, Monitoring Well Gauging Summary, Eastern Plume***—The water level measured in MW-231A is incorrect. The correct elevation is 23.66 feet, instead of 20.70 feet. It appears that the measurement was not transcribed correctly from Appendix B-1 field record sheet. (ED)

   Response—The Field Record of Well Gauging Form in Appendix B-1 was rechecked and the calculated value for the water table elevation of 20.70 ft is correct on the basis of the PVC casing elevation and the recorded depth of water measurement.

10. ***Table 5, Ground-Water Extraction Flow Rate and Run Time Summary***—This table was not updated in our report copies, and covers the same period as Monitoring Event 18. Please correct in the Annual Report for 2001. (ED)

Response—Table 5 will be updated and included in the 2001 Annual Report.

RESPONSE TO COMMENTS FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY ON SITES 1 AND 3 AND EASTERN PLUME, MONITORING EVENT 19, OCTOBER/NOVEMBER 2001 NAVAL AIR STATION, BRUNSWICK, MAINE

COMMENTOR: Michael Barry **DATED: 21 June 2002**

Thank you for the opportunity to review the above report, which was prepared for the Navy by EA Engineering, Science, and Technology. We have no comment to the report at this time. Regarding the results presented in the report, we will reserve comment until the draft 2001 annual report is presented.

EPA's primary concerns with the Eastern Plume are concurrently being worked through by the additional investigations proposed by the Navy and EPA. Also, for Site 9, the Technical Evaluation Group is working on a well optimization proposal.

Response—Comment noted.